# Western Lake Erie Basin (WLEB)
# Blanchard River Watershed Study
## Section 441 of the Water Resource Development Act of 1999
## General Investigations

# DRAFT
## Detailed Project Report/Environmental Impact Statement


**U.S. Army Corps of Engineers, Buffalo**

**APRIL 2015**

US Army Corps of Engineers
Buffalo District

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# EXECUTIVE SUMMARY

## 1. Authority and History

The purpose of the report is to evaluate measures for flood risk management in the Blanchard River watershed, focused on the area of Findlay, Ohio. Hancock County, Ohio, the non-Federal sponsor, requested assistance from the Corps of Engineers to study and provide recommendations for reducing significant flood damages in and around the Blanchard River and its tributaries.

This report was prepared as an interim response to the Western Lake Erie Basin, Ohio, Michigan, and Indiana study authorization outlined in Section 441 of the Water Resources and Development Act (WRDA) of 1999.

## 2. Purpose and Scope

The overall objective of the planning study is to reduce flood risk and improve the overall quality of life for the residents of the Findlay, Ohio area. The Findlay area experiences damages from overbank flooding because of insufficient capacity of the Blanchard River and its major tributaries, Eagle and Lye Creeks. The study area previously encompassed the area within and in the vicinity of Ottawa, Ohio, but this area received non-Federal funding to implement a flood risk management project without the assistance of the U.S. Army Corps of Engineers.

The area along the Blanchard River watershed consists of primarily agricultural lands. However, the city of Findlay is urbanized and includes extensive infrastructure associated with commercial, industrial, and high to medium density residential areas. The Blanchard River and its tributaries, especially Eagle and Lye Creeks are streams capable of carrying small frequent storm events. When large rainfall events occur, the water exceeds the channel capacity, resulting in overbank flow through the agricultural areas as well as the urbanized areas of the city. Substantial damage occurs at the .04 annual chance event (ACE) (25-year) and .02 ACE (50-year) annual chance event storms, as well as higher intensity, lower frequency storms.

*Baseline Conditions Subsection*

As part of the National Environmental Policy Act process, the existing conditions for 22 public interest categories concerning the Blanchard River Watershed were elucidated in order to outline baseline conditions within the project area. These include natural and cultural resource as well as various social interest categories. While the available data—collected either through desktop analysis or field study—was sufficient to establish baseline conditions within the Blanchard River Watershed, right of entry issues have led to data gaps in some public interest categories, including wetlands, threatened and endangered species, cultural resources and hazardous substances/petroleum products. It is anticipated that this information will be available during the

Preconstruction Engineering and Design Phase of the project, which will occur after the present Feasibility Phase is completed.

### 3. Alternatives Considered

The planning objectives for this study are as follows:

- Reduce flood risk and flood damages in Findlay area through the year 2077.
- Restore riparian wetland habitat along the Blanchard River and other areas in conjunction with flood risk management measures through the year 2077.

The base year for this study is 2027. This date provides a reasonable time frame for study completion and for the design and implementation of the recommended plan. The project life for economic justification purposes is 50 years; even though operation and maintenance of the project will continue. Considering a 50-year project life, this project will be in operation until 2077. The timeline outlined above is subject to future Congressional authorization and appropriations.

A wide variety of flood risk management measures were developed that would address one or more of the planning objectives. These measures were then evaluated and screened. Seven plans, as well as no Federal action alternative, which included one or more of the management measures were then evaluated and screened. The plans were evaluated for their cost efficiency, flood risk effectiveness, as well as their acceptability. From this screening, Plan F2 was recommended as the plan which best meets the National Economic Development objectives as it provided the highest net benefits, as well as the Recommended Plan. Plan F2 is described as follows:

- Western Diversion of Eagle Creek (Alternative 2 Alignment): This channel diverts flood flows in Eagle Creek to the Blanchard River at a location downstream of the City of Findlay.
- Blanchard to Lye Diversion Cutoff levee: During flood events, the overbank flow from the Blanchard River is often diverted to Lye Creek, which increases the severity of flooding in this watershed. This low levee would cutoff this cross flow between the two watercourses and lower flood risk, especially along Lye Creek. However, this also increases flood risk along portions of the Blanchard River, primarily in agricultural areas.

### 4. Impacts, Compliance and Public and Agency Involvement

*Impacts Section*

Information concerning the anticipated environmental effects of the project measures/alternatives, and the impacts to the existing and future without project conditions were categorized as either no impact or minor, moderate or major based on their projected severity and regional implications. Assessing the potential impacts of these measures proved difficult in some instances because of an

inability to access all properties within the study area. Nevertheless, it is expected that most impacts to public interest categories are expected to be minor. Moderate impacts to land use, streams, wetlands, water quality cultural resources and aesthetics/visual resources are expected through the implementation of the Alternative 2 Alignment, while moderate benefits to recreation and socioeconomics are also expected. Analysis of the Aurand Run Alignment, which was another diversion channel option to carry Eagle Creek flows around the city of Findlay, resulted in major impacts to streams, wetlands, vegetation, wildlife and aquatic resources, water quality, and aesthetics/visual resources. Agency comments received from the US Environmental Protection Agency and the US Fish and Wildlife Service outlined their environmental concern for the Aurand Run Alignment compared to the Alternative 2 Alignment due to the overarching environmental impacts associated with the former measure. Recreation and socioeconomics, on the other hand, are expected to benefit through the implementation of the Aurand Run Alignment. Minor impacts to wetlands and cultural resources are expected to occur through the implementation of the Blanchard to Lye Cutoff Levee. Major benefits to human health and safety are expected from the implementation of either western diversion as well as the Blanchard to Lye Cutoff Levee.

*Environmental Compliance*

The feasibility phase of this study was conducted in full compliance with pertinent environmental and agricultural acts and executive orders. Full compliance concerning the Clean Water Act, the Fish and Wildlife Coordination Act, the Endangered Species Act and the National Historic Preservation Act is expected to be achieved during the Preconstruction, Engineering and Design (PED) phase.

*Public and Agency Involvement*

The Buffalo District USACE has participated in regularly-occurring project sponsor meetings with Hancock County and the city of Findlay since the 2007 flooding event in the Blanchard River Watershed. Meetings with the resource agencies, including four state agencies and two Federal agencies have occurred annually, for the most part, since 2009. Meetings with the public initiated with public scoping meetings, which occurred in November of 2011. Subsequent public meetings included landowner meetings in May 2012 followed by meetings concerning the final array of project alternatives in December 2012. USACE has identified eight Indian nations that have ancestral homelands within the Blanchard River watershed. Of these nations, the Wyandotte Nation requested involvement as a consulting party on this study. An on-site meeting in the project area, followed by the formulation and execution of a Programmatic Agreement with the Wyandotte Nation is scheduled to occur prior to completion of the Final Feasibility Study/EIS.

**5. Benefits and Costs**

Plan F2, as the NED and Recommended Plan, has the highest net annual benefits of about $671,600 with a benefit to cost ratio of 1.22. The annual benefits from the recommended plan are approximately $3.78 million.

The current preliminary estimate for project implementation is $71,393,000 with a sponsor contribution of $28,661,000 and a Federal contribution of $43,278,000. The estimated cost of Lands, Easements, Rights-of-way, Relocations and Disposal areas (LERRDs) is $25,064,000.

## 6. Study Schedule

The 45-day Public Review of the Draft Report began on 10 April 2015. After evaluation of comments received, the Civil Works Review Board will occur in late 2015, or early 2016 and the Final Report will be issued for a 30-day State and Agency review period. Following the review period, the Chief's Report is anticipated to be issued in early Spring 2016.

# 1.0 Study Authority

The Water Resources Development Act of 1999 (WRDA 99) provides authorization for this study under Section 441 – Western Lake Erie Basin, Ohio, Indiana and Michigan. It states:

> " (a) IN GENERAL.—The Secretary shall conduct a study to develop measures to improve flood control, navigation, water quality, recreation, and fish and wildlife habitat in a comprehensive manner in the western Lake Erie basin, Ohio, Indiana, and Michigan, including watersheds of the Maumee, Ottawa, and Portage Rivers.;
>
> (b) COOPERATION.—In carrying out the study, the Secretary shall— (1) cooperate with interested Federal, State, and local agencies and nongovernmental organizations; and (2) consider all relevant programs of the agencies".
>
> (c) REPORT. – Not later than 1 year after the date of enactment of this Act, the Secretary shall submit to Congress a report on the results of the study, including findings and recommendations."

In direct response to the above authorizing language and the growing concern regarding flooding in the watershed, the USACE Buffalo District initiated a General Investigation Feasibility Study (GI/FS) and prepared the Interim Feasibility Report for the Blanchard River Watershed to satisfy the study goals outlined in WRDA 99. This Feasibility Report has been prepared in accordance with applicable regulations and guidance. It describes existing conditions and expected future without project conditions for the vicinity of the city of Findlay and documents the screening of measures and the development and evaluation of alternatives which provide the basis for recommending a flood risk management plan for implementation.

On September 30, 2008 the Buffalo District and Hancock County executed a Feasibility Cost Sharing Agreement (FCSA) to conduct a feasibility study which addressed Flood Risk Management in the Blanchard River Watershed. The cost sharing for this study is based on a 50 percent Federal contribution and a 50 percent non-Federal contribution

## 1.1 Non-Federal Sponsorship

Hancock County is the official non-Federal sponsor for the study. At some future point, the non-Federal sponsorship may pass to an entity, such as a conservancy district, that will perform the design and construction efforts for the project. The Maumee Watershed Conservancy District has jurisdiction over the Blanchard River watershed and has expressed interest in acting as the project sponsor during the next phases, to include PED and construction. In Ohio, conservancy districts typically are responsible for the design, construction and future operation and maintenance of flood risk management projects, including mitigation requirements to ensure long term success. Conservancy districts are required to add a project to their official plan prior to formal acceptance of a project. As a result, local governments are typically responsible for planning of flood risk management projects.

## 1.2 Stakeholders

In addition to the Federal and State agencies who have participated in the development of this study, the city of Findlay, village of Ottawa and Putnam County have been active study participants and have contributed with the development of the alternative plans.

After the flooding in 2007, the Northwest Ohio Flood Mitigation Partnership was established to guide and expedite the development of a flood risk proposal which would help to minimize the impacts of future flood events. This partnership was a public-private partnership which once Hancock County was identified as the non-Federal sponsor and the funding secured to proceed with the development of the watershed study, this partnership transitioned to an advocacy role and did not participate in the evaluation of alternatives for the project.

# 2.0 Study Purpose and Scope (Purpose and Need)

The purpose of this report is to present the findings of a feasibility investigation that was conducted to determine if there was a Federal interest in providing flood risk management improvements in the Blanchard River Watershed in the area of Findlay, Ohio. The Findlay area experiences damages from overbank flooding during high intensity rain events. This report analyzes the problems and opportunities and expresses desired outcomes as planning objectives.

Plans were then developed to address these objectives. These plans include a No Action Plan and various combinations of structural and nonstructural measures. The economic and environmental impacts of the plans were then evaluated and a feasible plan was recommended. This Draft Feasibility Report and Environmental Impact Statement presents the results of this evaluation for public, agency, and peer review comment. After receipt of comments, the recommended plan will be evaluated based on the input and changes to the plan may be made. The report also presents details on USACE and non-Federal sponsor participation needed to implement the recommended plan. The report concludes with a preliminary recommendation for authorization.

## 2.1 Study Area

As a tributary of the Maumee River, the study authority covers the Blanchard River Watershed, a sub-basin of the western Lake Erie Basin, which is located in northwestern Ohio. The study area consists of the watershed boundaries of the Blanchard River within Putnam, Hancock, Seneca, Allen, Harden and Wyandot Counties (see Figure 2.1). The watercourses which comprise the Blanchard River watershed drain directly to the Auglaize River and eventually flows into the Maumee River before entering into Lake Erie.

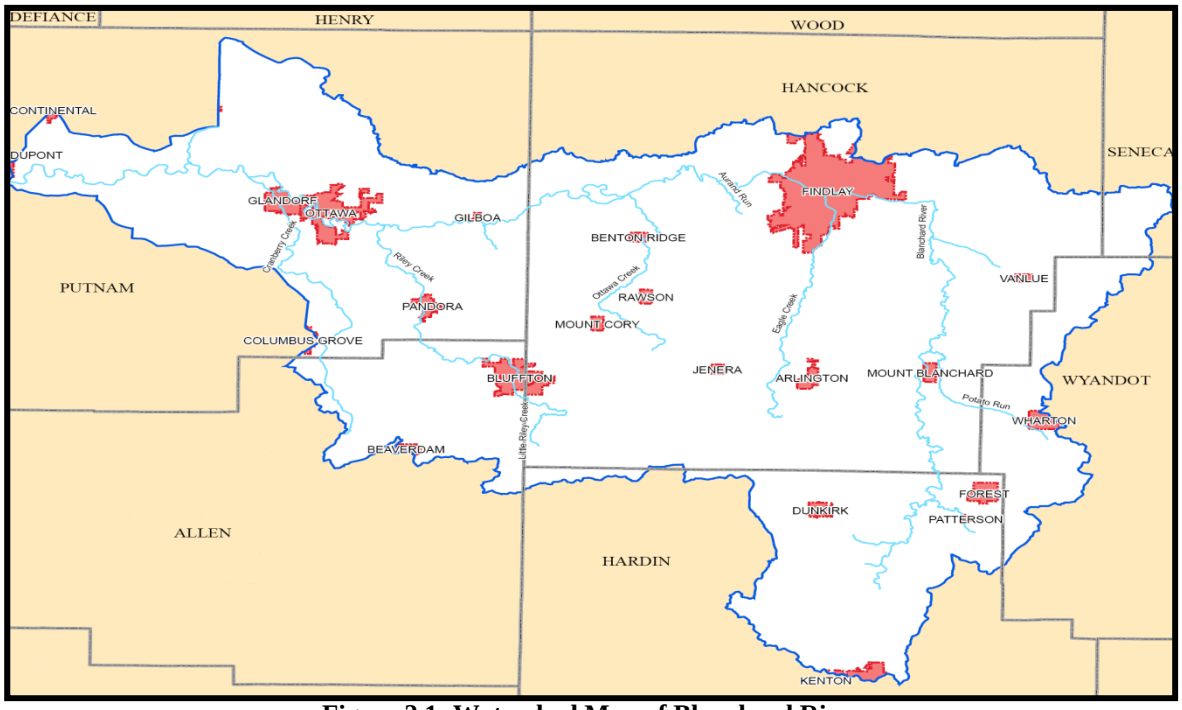


**Figure 2.1: Watershed Map of Blanchard River**

## 2.2 Study Focus

The current study is focused on reducing flood risk in the area of the city of Findlay (population 41,202; Figure 2.2a). While the study area outlined in the project scoping identified the village of Ottawa as an additional area of focus (Figure 2.2b), it was removed from the study area at the request of the local sponsor and officials in the village due to the implementation of a non-Federal flood risk management project in that area. In order to facilitate analysis of the major flood risks, Findlay receives the majority of damages from overbank flooding of the Blanchard River and its tributaries. Findlay is the county seat for Hancock County and is an important regional business center. It is headquarters to several major corporations including Marathon Petroleum, a Fortune 25 Corporation, and Cooper Tire, a Fortune 500 Corporation.

The Blanchard River watershed is characterized by alluvial flatlands prone to flooding resulting in repeated flood damages, primarily in Findlay and Ottawa. The repetitive flooding prompted the Western Lake Erie Study authorization in 1999. The Blanchard River has reached or exceeded major flood stage 25 times since 1913. Of these, ten flood events have occurred since 1990. For events between 1990 and the present, five are among the top ten stages ever recorded; three have peaked at more than three feet over major flood stage; and one event, the August 2007 event, reached a peak stage of only 0.04 feet less than the maximum recorded peak of 18.5 feet in 1913. Damages during the 2007 flood event exceeded $60 million in the Findlay area and $20 million in the Ottawa area, as estimated by the Northwest Ohio Flood Mitigation Partnership. According to local officials, damage estimates for the events since the 2007 flood have ranged from about $5 million to $25 million per event in Findlay.

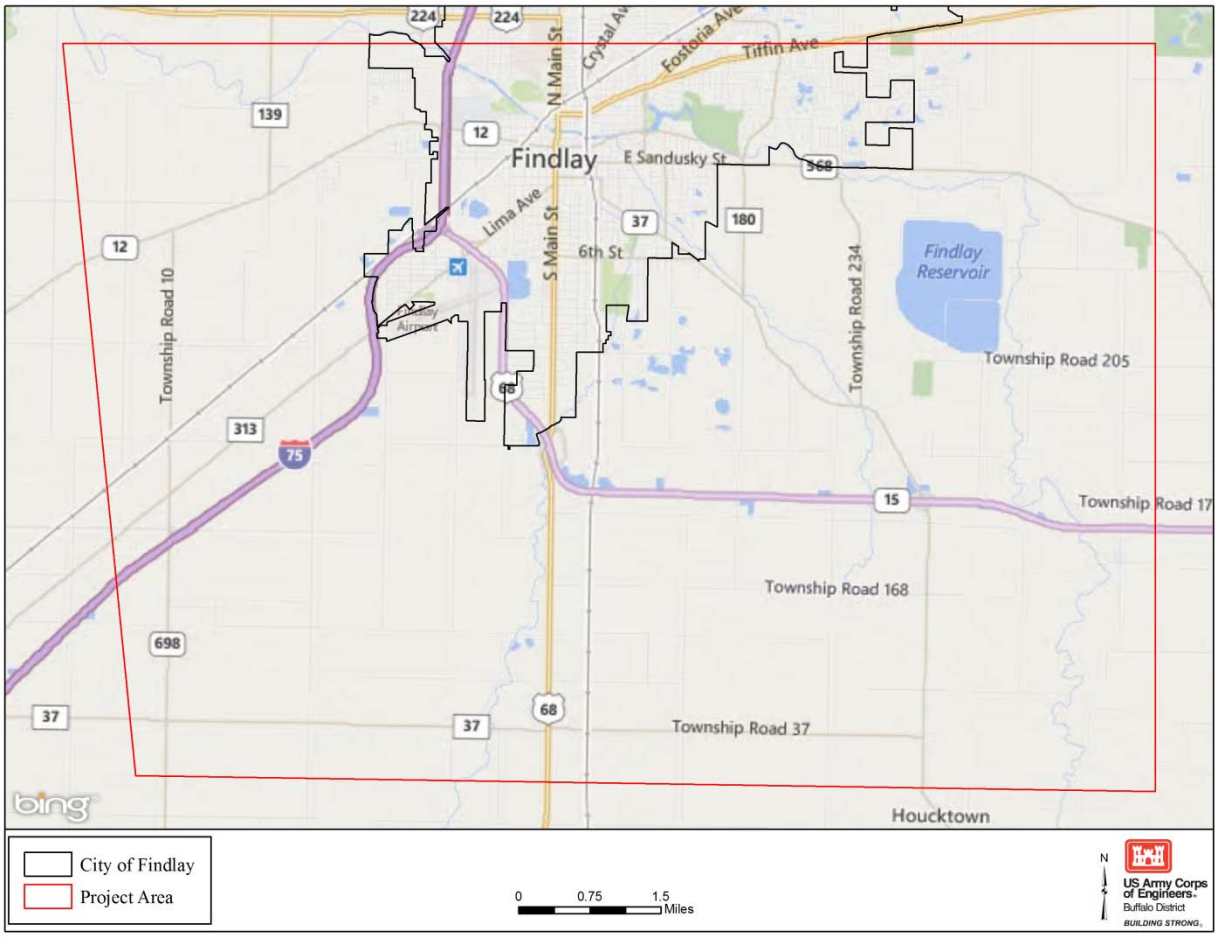


**Figure 2.2a: Findlay, OH project area**

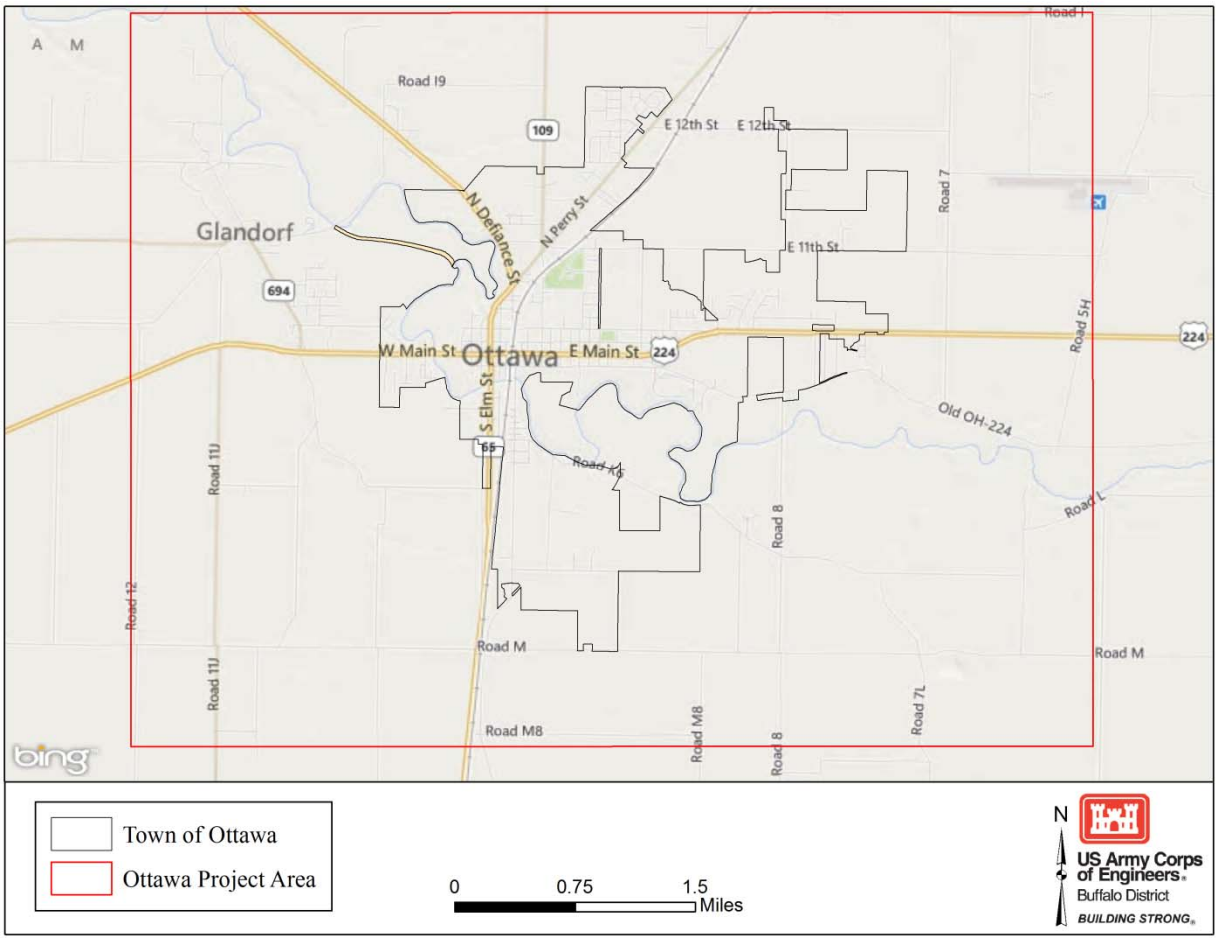


**Figure 2.2b: Ottawa, OH project area**

## 2.3 History of the Investigation

Investigation of flooding problems on the Blanchard River was initiated as two small flood risk management studies as authorized under Section 205 of the Flood Control Act of 1948. One study addressed flood risk management for the Findlay area and the other was for the Ottawa area. These studies were initiated in 2007 after both communities received significant property damage and some loss of life (at least one death). Separately, a watershed investigation was initiated in 2008 to investigate other water resource related issues within the entire watershed. In 2010, it became apparent that the scale and scope of the Section 205 studies exceeded the $7 million Federal fund limit for the authority and associated flood risk management investigations were transitioned into the overall Blanchard River Watershed Study.

The study area as outlined in the scoping package in December 2012 previously encompassed the area around Ottawa, Ohio. However, in May 2014, the village of Ottawa indicated they had secured non-Federal funding to construct a flood management project based on the work performed under the Blanchard River Watershed Study. At this time, the Maumee Watershed

Conservancy District is using technical and planning information which had been documented to date to proceed with the implementation of a flood risk management project without the assistance of the US Army Corps of Engineers. Therefore, the Ottawa area is no longer part of the project study area.

The remainder of this study will focus on the flood risk management measures for the city of Findlay. A closure report documenting the issues related to flood risk management along the Blanchard River in the vicinity of the village of Ottawa, including measure screening and plan formulation will be prepared under separate cover.

In July 2012, this study transitioned to the new SMART planning process. The purpose of the SMART planning is to provide the Nation with a defined study process whereby the water resource mission served by the Corps completes feasibility studies with more reliance on professional engineering, economics, judgment, and analyses with the focus being to limit the amount of technical data collected in the initial planning.

The new study paradigm recognizes that no single factor, including Net Economic Development, should provide the basis for the USACE decision for a recommendation for Federal investment. Alternative comparison and selection recognizes that there is no single "best plan", and that quantitative and qualitative decision making must be used to ultimately make a recommendation of a plan that meets the requirements of the Federal government, the non-Federal sponsor, and the impacted community.

# 3.0 Prior Studies, Reports and Existing Water Projects

## 3.1 Prior Studies and Reports

Prior studies relevant to flooding and environmental issues in the Blanchard River Watershed include the following:

USACE *Survey Report of Flood Control at the City of Findlay*, 1962. This study looked at several potential solutions to flooding in the Findlay area, including floodplain evacuations, upstream reservoirs, channel improvements, stream diversions, levees and floodwalls. A system of levees and floodwalls was the recommended alternative for the city of Findlay. The plan required numerous features including earthen levees, floodwalls, channel relocations/improvements, numerous bridge modifications, interior pump stations, diversions and gravity outlets, and property acquisition. This plan was never implemented.

USACE *Survey Report for Flood Control at the Village of Ottawa*, 1964. This study examined several potential solutions to flooding problems within the village, including upstream reservoirs, evacuation of the floodplain, channel improvements, a high velocity channel, diversions, and levees and floodwalls. A system of levees and floodwalls were included as the primary components of the recommended plan for Ottawa. This plan was later reevaluated in 1987.

USACE *General Reevaluation Report (GRR) for the Village of Ottawa,* 1987. The purpose of this study was to update the 1964 study report to reflect current information. Eleven structural and seven non-structural alternatives were evaluated. Recommendations were significantly downsized from the recommendations in the earlier report. The GRR concluded that local interests strongly opposed the recommended plan of levees and floodwalls, and favored other measures such as clearing and snagging or channel work.

URS *Draft Alternatives Assessment for Findlay and Ottawa, Ohio Flood Damage Reduction Project* prepared for the Northwest Ohio Flood Mitigation Partnership (NWOFMP) in December 2008. The purpose of this memorandum was to assess continued viability of previously considered or recommended alternatives and how current USACE policy, technical and environmental requirements might impact potential alternatives.

USACE *Western Lake Erie Basin (WLEB) Study – Blanchard Watershed Assessment,* 2009. The purpose of this report was to integrate existing projects, plans and studies; assess program progress; and plan future watershed revitalization programs and projects from various federal, state, local and non-governmental organizations to provide public agencies, watershed groups and other stakeholders with a tool to facilitate the restoration, protection and sustainable use of the water and related natural resources within the larger WLEB.

Ohio Environmental Protection Agency *Total Maximum Daily Loads for the Blanchard River Watershed, 2009*. The report identified and evaluated water quality problems in the Blanchard River Watershed and proposed solutions to bring affected waters into attainment with water quality standards.

USACE *Blanchard River Watershed, Ohio, Draft Alternative Development Memorandum,* 2010. This memorandum describes projects focusing on flood damage reduction and ecosystem restoration within the study area for individual communities and areas within the overall watershed. It presents feasible projects focusing on flood damage reduction and ecosystem restoration within the study area and addresses the nature and extent of flooding problems within the Blanchard River Watershed; opportunities for multipurpose projects that address both flood risk migration and ecosystem restoration; identifies an inventory of potential wetland improvement areas; and the form and function of each identified opportunity. This memorandum focused on areas in the watershed outside of Findlay and Ottawa.

United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) *Upper Auglaize Watershed Agriculture Non-Point Source (AGNPS) Modeling Project – Final Report,* 2005. The Upper Auglaize Watershed AGNPS Modeling Project was an interagency effort to use a Geographic Information System (GIS)-based modeling approach for assessing and reducing pollution from agricultural runoff and other non-point sources. This project applied the AGNPS suite of models to the Upper Auglaize River Watershed, a major watershed within the Maumee River Basin. This modeling project was conducted by an

interagency team to determine sediment sources, contributing locations, and the effect of application of best management practices (BMPs) on rates of sediment delivery to the mouth of the watershed. The results of the analysis demonstrated that the application of BMPs would have a positive effect on reducing the loadings of sediment leaving the mouth of the Upper Auglaize Watershed. The results will be used to guide conservation incentive and land treatment programs.

## 3.2 Existing Projects

The Blanchard River Watershed has a modest number of dams consisting of small in-line, non-flood control dams and weirs. These structures were not constructed for flood control purposes, but rather serve to create ponding areas for fishing or for old water supply intakes. They are typically submerged during flood flows, and due to their relatively small size, have only limited value as flood control infrastructure. Environmentally, their presence may have contributed to elevated water temperatures.

To date, no USACE projects have been implemented in the Blanchard River watershed. The severity of the August 2007 flood prompted other entities in the study area to initiate various non-structural efforts, including elevation and acquisition of approximately 131 structures in the City of Findlay, implementation of a flood warning system, and an ongoing maintenance effort that involves cleaning and snagging of the Blanchard River to prevent backwater problems during low flow events (<0.50 annual chance event (ACE)). These are discussed below:

*Hazard Mitigation Grant Program (HMGP) Projects.* Local officials in Findlay have initiated local projects to elevate or acquire substantially at-risk structures using grant funding secured through the Federal Emergency Management Agency's Hazard Mitigation Grant Program (HMGP) or through other non-Federal programs. A summary of non-structural projects project summary is included in Table 3.2.

Table 3.2 Non Structural Project Summary: Findlay and Ottawa, Ohio

| Municipality | Disaster Declaration or Reference | Number of Structures/Properties Acquired | Total Project Cost |
|---|---|---|---|
| Findlay | DR[1] 1720 | 25 | $910,413 |
| | FMA[2] 2007 | 5 | $269,483 |
| | FMA 2008 | 2 | $132,708 |
| | HMGP[3]-Application #1 | 11 | $672,058 |
| | HMGP –Application #2 | 24 | $1,515,892 |
| | Properties purchased through ¼% Property Tax | 37 | $1,980,144 |
| | Properties purchased through State Grant | 23 | $1,319,659 |
| | DR 4077 | 4 | $515,000 |
| Total for Findlay | | 131 | $7,211,535 |

1 DR- Disaster Declaration
2 FMA – Flood Mitigation Assistance
3HMGP – Hazard Mitigation Grant Program

Flood Warning and Inundation Mapping System. A flood warning system and flood inundation mapping system for the city of Findlay has been completed by the USGS in cooperation with the city of Findlay, and the National Weather Service. The link to the site is as follows: http://water.weather.gov/ahps2/inundation/inundation_google.php?gage=fdyo1

The Hazard Mitigation Plan for the city of Findlay outlines flood plain management guidelines which are stricter than outlined by the National Flood Insurance Program (NFIP). Additionally, the city has implemented flood damage reduction ordinances which consist of compensatory storage guidelines, the restriction of placing critical facilities such as hospitals, nursing homes police and fire stations within the 0.01 annual chance event flood plain boundary. Subdivisions and large scale developments must also minimize flood damage according to Flood Damage Ordinance 1351. Streets must be designed to have a minimum of 10 feet of pavement width that is equal to, or above the 0.01 annual chance event flood (100 year flood plain).

Clearing and Snagging Projects. Many areas within the Blanchard River Watershed, particularly in the upper reaches, are characterized by extensive sedimentation. In addition, the emerald ash borer has killed the majority of ash trees along the river which are falling into the channel and creating small localized log jams. Both Hancock and Putnam Counties have secured millions of dollars in grant funding to allow for the clearing and snagging of log jams in the Blanchard River and its tributaries. While clearing and snagging is beneficial for localized flooding from frequent, low intensity flood events, it is less beneficial for large flood events as a result of high intensity storms which generally causes the majority of damages due to the flooding of the Blanchard River.

The city of Findlay has implemented a Reverse 911 flood warning system to alert residents of potential flood events. This Reverse 911 system utilizes information gained from the stream gages in Findlay. Additionally, Findlay employs social networking to alert residents of potential flood events.

# 4.0 Problem Objectives, Description, and Constraints

## 4.1 Problems and Opportunities

### 4.1.1 Problems

Flooding causing significant repeated damages has been increasing in recent decades in the Blanchard River Watershed. Most damage due to flooding is primarily the result of overbank flooding primarily due to the incapacity of the natural channel of the Blanchard River to accommodate high intensity rainfall events. Although the primary sources of flooding in this basin is increasing overbank flooding due to higher frequency intense storms, other sources of increased flow include increased imperviousness in urban areas, changes in agricultural drainage such as increased tile drainage, changes in agricultural practices including changes in soil

conservation practices such as no-till farming as well as more intense agricultural practices. Flooding is more common during the late winter or early spring as a result of heavy rains combined with melting snow, often while the ground is still frozen. Severe flooding also occurs in the late summer or early fall when more intense storm systems occur. Recent flooding in 2007 resulted in both a Presidential Major Disaster and Governor's Disaster Declarations. These disasters have caused millions of dollars in damages to homes, businesses, personal property, and agricultural crops.

The most significant flooding impacts in the watershed have occurred in the city of Findlay, where the primary problem is frequent and serious flooding which inundates a significant portion of each community, including the high value downtown business districts. These frequent and, at times, severe floods (most recently in 2006, 2007(twice), 2008, 2009,2011, and 2013 (twice)) have caused extensive damage to downtown businesses and nearby residential areas, where it is not uncommon for water levels to remain above flood stage for several days. Extensive rescue operations are often required during the floods and major cleanup and restoration expenses are incurred by local, State and Federal governments. The Blanchard River has reached major flood stage of 13 feet or greater 25 times since 1913. Of these, ten have occurred since 1990. For events between 1990 and 2011, five are among the top ten stages ever recorded; three have peaked at more than three feet over major flood stage; and one (the August 2007 event) reached a peak stage of 18.46 feet – only 0.04 feet less than the highest recorded peak stage in 1913.

Ottawa Business District, 1913


Ottawa Business District, 1959

Ottawa Business District, 2007

Findlay Business District, 1913


Findlay Business District, 1959

Main Cross at I-75, 2007

**Figure 4.1.1a Comparison of Current and Historical photos illustrating flooding in the city of Findlay and village of Ottawa**

The Blanchard River, Eagle Creek and Lye Creek all converge in Findlay's downtown business district. Serious flooding in Findlay has been reported in local newspaper articles dating back to January 1846. Other serious floods occurred in Findlay in 1881, 1883, 1888, 1904, 1913, 1927,

1950, 1959, 1981, 1990, 1997, 2006, 2007, 2008, 2009, 2011, 2012, and 2013. According to the U.S. Geological Survey (USGS) stream gage data at Findlay, the Blanchard River has reached flood stage at least once in 15 of the last 20 years. The National Weather Service reports that Findlay experienced five flooding events between December 2006 and March 2009 that were considered larger than the ten percent annual chance flood; and two of the four floods were within the top five floods ever recorded in Findlay.

In Findlay, the Blanchard River and Eagle and Lye Creeks are significant sources of flood damage due to overbank flooding. In addition, the extent of overbank flooding along the Blanchard River south of the Findlay Reservoir is such that the overbank flow enters Lye Creek, increasing the severity of flooding along this watercourse.

The flood of record for Findlay was the flood of March 1913. During this event the flow in the Blanchard River at Findlay was an estimated 22,000 cubic feet per second (cfs) and the river crested at 18.5 feet in Findlay – 7.5 feet over flood stage. The August 2007 flood event peaked at nearly the same level, with a crest of 18.46 feet at Findlay and a discharge of 14,500 cfs. Four of Findlay's top ten floods have occurred since 2005; two of these are among the top five. Figure 4.1.1b presents the flood levels and dates for these top ten floods.

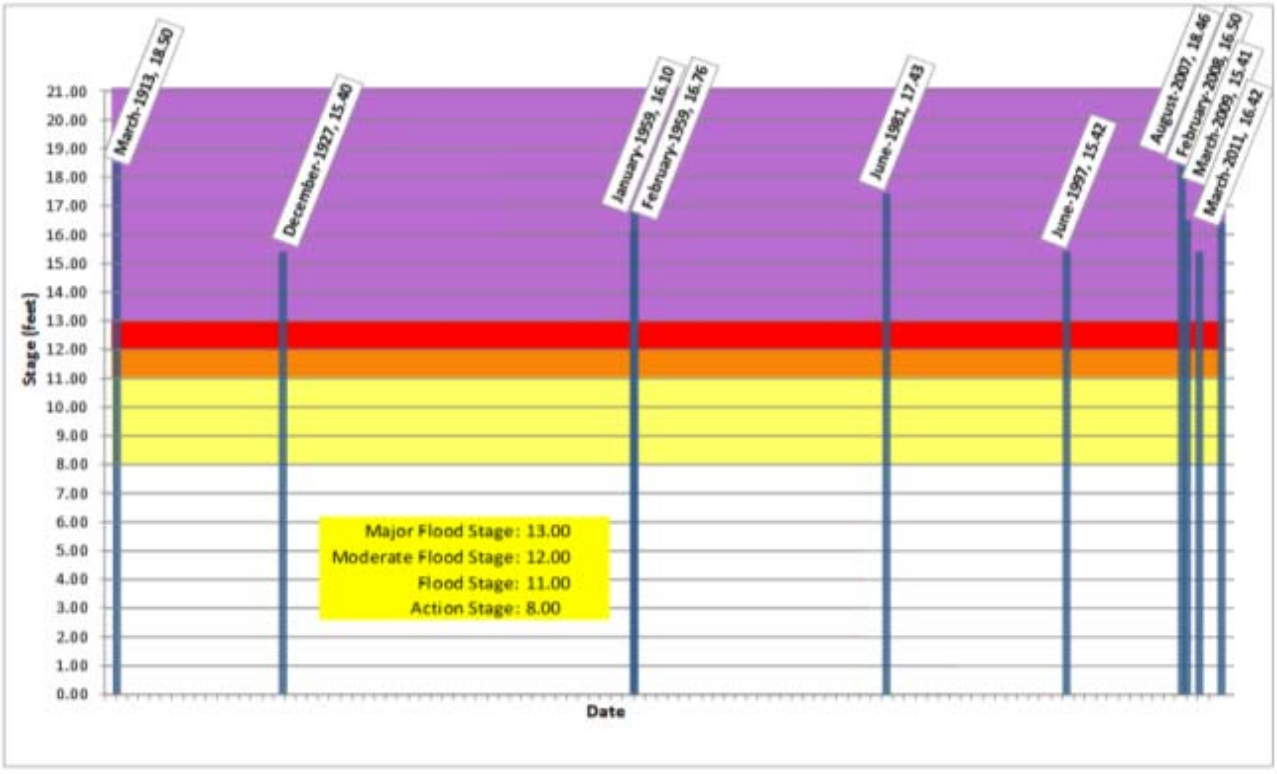


**Figure 4.1.1b Historical Floods along the Blanchard River**

Identified problems for the Findlay area are stated as follows:

- A primary problem in the Blanchard River Watershed relates to overbank flooding affecting the city of Findlay, primarily in the areas surrounding the Blanchard River, and Lye and Eagle Creeks. The Blanchard River has reached major flood stage of more than 13 feet 25 times since 1913. Of these, ten have occurred since 1990.
- Damages as a result of flooding, in this largely agricultural watershed, are significant in the city of Findlay and Hancock County.
- The extent of the flooding often inundates bridges and approach roads to a level which requires their closure, with the exception of Interstate 75, which limits access to emergency services, particularly to the regional hospital, located south of the Blanchard River in Findlay. Flooded roads and the relatively short warning times have contributed to loss of life and significantly impacted regional transportation access, impacting emergency services, local businesses, and regional commerce.
- The city of Findlay and surrounding areas have experienced 4 out of the top 10 flood events in the last 4 years. Flooding is occurring at a more frequent and damaging level which impacts the operation and viability of the city.
- There is a limited amount of riparian habitat along the Blanchard River.

### 4.1.2 Opportunities

Opportunities describe a future desirable condition and assists in the definition of state of the watershed after the project is completed. :

**Opportunity 1:** Construct a structural and non-structural flood risk management plan which can reduce the risk of flood damages in the Findlay area from overbank flooding caused by the Blanchard River.

**Opportunity 2:** Reduce damage to existing buildings and contents, infrastructure, agricultural lands and associated damages to crops.

**Opportunity 3**: Although not the primary focus of this study, the opportunity exists to improve the ecological condition of portions of the Blanchard River watershed by lowering flows in portions of the natural channel and in areas where land is acquired for the project.

**Opportunity 4:** An opportunity exists to provide wetland mitigation along the Blanchard River, and stream mitigation along Lye Creek and Aurand Run.

## 4.2 Planning Objectives

Planning objectives are identified based on the needs and opportunities as well as existing physical and environmental conditions present in the project area. In general, the prime Federal objective is to contribute to the National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable

executive orders and other Federal planning requirements. Contributions to the NED are increases in net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct net benefits that accrue in the planning area and the rest of the Nation. Accordingly, the following objectives have been identified:

- Reduce flood risk and flood damages in Findlay area.
- Restore riparian wetland habitat along the Blanchard River and other areas in conjunction with flood risk management measures.

With the goal of flood risk management, the objective is to reduce flood damages in the Blanchard River Watershed. The focus of this Interim Feasibility Report is to identify flood risk management solutions for the city of Findlay and the surrounding area.

The base year for this study is 2027, when project construction is complete. This date provides a reasonable time frame for study completion and for the design and implementation of the recommended plan. For calculation of economic benefits, the project is assumed to have a 50-year project life, or 2077. However, the Project Partnership Agreement with the sponsor is effective in perpetuity and requires continual upkeep and maintenance of the project. The timeline outlined above is subject to future Congressional authorization and appropriations.

The objectives outlined above are consistent with Engineer Pamphlet 1165-2-1, Digest of Water Resources Policies and Authorities, as well as the Planning Guidance Notebook (ER 1105-2-100).

## 4.3 Constraints

Constraints are factors which limit the planning process. Each study has a list of constraints which are unique to the particular study. Constraints can be considered universal in that they form the basis for any study. Study specific constraints are statements of things unique to a specific study and identify what the alternative plan should avoid. Listed below are the study specific constraints which have been identified for the Blanchard River Watershed study.

- Any plan for flood risk reduction should avoid, minimize, or provide mitigation for induced flooding in the study area.
- Minimize the use of agricultural lands where applicable for the implementation of any project.
- Minimize impacts to agricultural lands with respect to impacts to crops and other uses.
- Avoid using properties which have been purchased using FEMA mitigation grant program funds which limit construction of structural measures.
- Avoid or minimize impacts, or provide mitigation for cultural resources including sites with historic, cultural or archaeological significance.
- Ecosystem restoration will only be pursued within the real estate footprint required for the flood risk management project.

- Avoid impacts to Federally listed threatened and endangered species found in the watershed.
- Minimize impacts on the success of Federal or State strategies to reduce water quality impairments such as high nutrient or sediment loads.
- Plans should avoid known HTRW sites.
- Lack of access to properties during the planning phase to perform field surveys may result in an elevated level of risk when making planning decisions due to uncertainty involved with the use of incomplete information.
- Any plan for flood risk reduction must consider the activities and time factor required for real estate right of entries which are needed to perform technical investigations and for the real estate interests required for project implementation.

## 5.0 Existing Conditions

An inventory of applicable social, economic, and environmental factors has been created for the study area within and around Findlay, Ohio. This inventory serves as the foundation for a full consideration of those areas of information that contribute to the recommended plan presented later in this report. These factors also establish a baseline against which the potential impacts of project measures and alternatives can be measured. Because access to all properties within the study area was not available during this evaluation, the information presented is to varying levels of detail and completeness. While public interest information is lacking in many categories, one of the purposes of releasing the draft DPR/EIS is to obtain additional information from the public that may be available and pertinent to the feasibility study and to help inform the Federal decision. Table 5.1a below presents a summary of the level of completeness for each category of information at the time of this writing as a result of a lack of access, the need for further investigation, or other data difficulties.

*Baseline Data Completeness*

| Table 5.1a Data Completeness of Public Interest Categories | | | | |
|---|---|---|---|---|
| **Public Interest Category/Measure** | **No Action** | **West Diversion Alignment 2** | **West Diversion Aurand Run** | **Blanchard to Lye Cutoff** |
| Land Use | H | H | H | H |
| Geology & Soils | M | M | M | M |
| Groundwater | H | H | H | H |
| Streams | H | H | H | H |
| Floodplains | H | H | H | H |
| Wetlands | M | L | H | L |
| Vegetation | H | H | H | H |
| Wildlife & Aquatic Resources | H | H | H | H |
| Threatened & Endangered Species | M[1] | M[1] | M[1] | M[1] |
| Air Quality | H | H | H | H |
| Water Quality | H | H | H | H |
| Noise | M | M | M | M |
| Cultural Resources | M | M[1] | M[1] | M[1] |
| Utilities & Infrastructure | H | H | L | H |
| Transportation | H | H | H | H |
| Aesthetics & Visual Resources | H | H | H | H |
| Recreation | H | H | H | H |
| Hazardous Substances/Petroleum Products[2] | H | M[1, 3] | M[2] | M[1] |
| Socioeconomics | H | H | H | H |
| Environmental Justice | H | H | H | H |
| Human Health & Safety | H | H | H | H |
| Sustainability, Greening & Climate Change | H | H | H | H |

H – High Completeness, all or most data needed to adequately address public interest categories are available.
M – Moderate Completeness, some data needed to adequately address public interest categories are available.
L – Low Completeness, no to little data available to adequately address public interest categories.
[1] – Limited site inspections conducted; access not available for most properties.
[2] – Assessment of potential HTRW impacts performed via preliminary screening of database search report, published information & Phase I ESAs; site inspections & interviews not conducted in accordance with ASTM E 1527-05 & E 2247-08.
[3] – Follow-up assessment of former petroleum bulk storage facility recommended.

## 5.1 Land Use

The 2011 National Land Cover Database (NLCD) Data includes the most up-to-date data concerning land use within the Blanchard River Watershed. Land use was comprised of approximately 402,500 acres of agricultural land (which included hay/pastures and cultivated crops); 35,000 acres of forest and herbaceous areas; 31,600 acres of developed open space; 20,300 acres of developed urban areas (ranging between low to high intensity), 1,700 acres of wetlands; and 430 acres of barren land. Table 5.1b and Figure 5.1a depict the various land uses in the Blanchard Watershed.

| Table 5.1b. Blanchard Watershed Land Cover (NLCD, 2011) | | |
|---|---|---|
| **Land Cover Class** | **Percent Cover** | **Acreage** |
| Open Water | 0.47% | 2328.60 |
| Developed, Open Space | 6.41% | 31687.05 |
| Developed, Low Intensity | 2.76% | 13650.16 |
| Developed, Medium Intensity | 0.96% | 4735.79 |
| Developed, High Intensity | 0.39% | 1906.74 |
| Barren Land | 0.09% | 430.32 |
| Deciduous Forest | 5.51% | 27213.50 |
| Coniferous Forest | 0.02% | 120.66 |
| Herbaceous | 1.59% | 7859.37 |
| Hay/Pasture | 1.01% | 4998.71 |
| Cultivated Crops | 80.44% | 397406.80 |
| Woody Wetlands | 0.08% | 375.78 |
| Emergent Herbaceous Wetlands | 0.27% | 1337.50 |

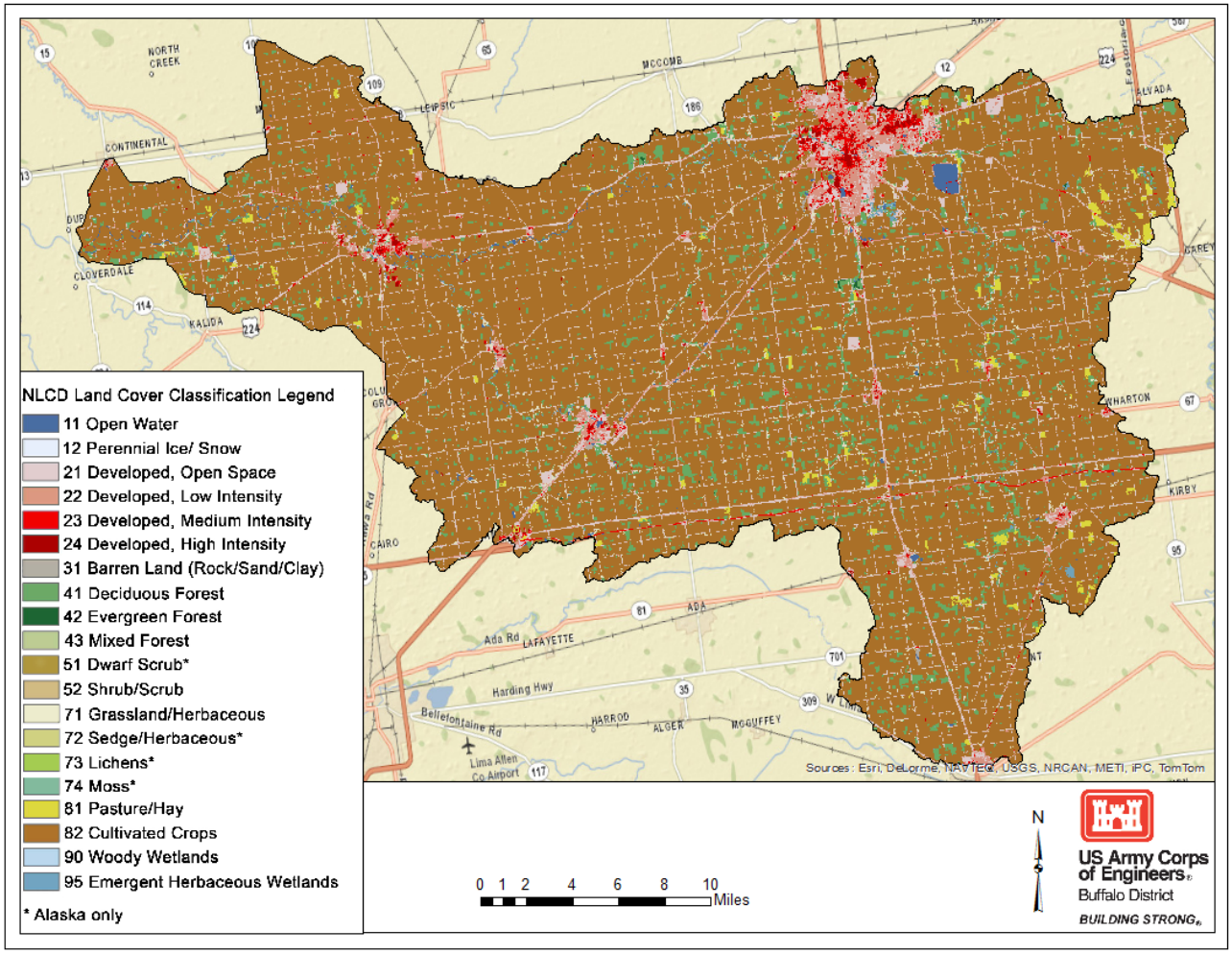


**Figure 5.1a Blanchard Watershed Land Cover Classification (NLCD, 2011)**

According to the NLCD, there has been an increase in developed impervious surfaces in the city of Findlay between 2006 and 2011 (Figure 5.1b). This is noteworthy as increases in impervious surfaces can lead to lower water quality, higher nutrient loads, and increased stormwater runoff. There have not been any notable changes outside of Findlay and land uses have largely remained unchanged.

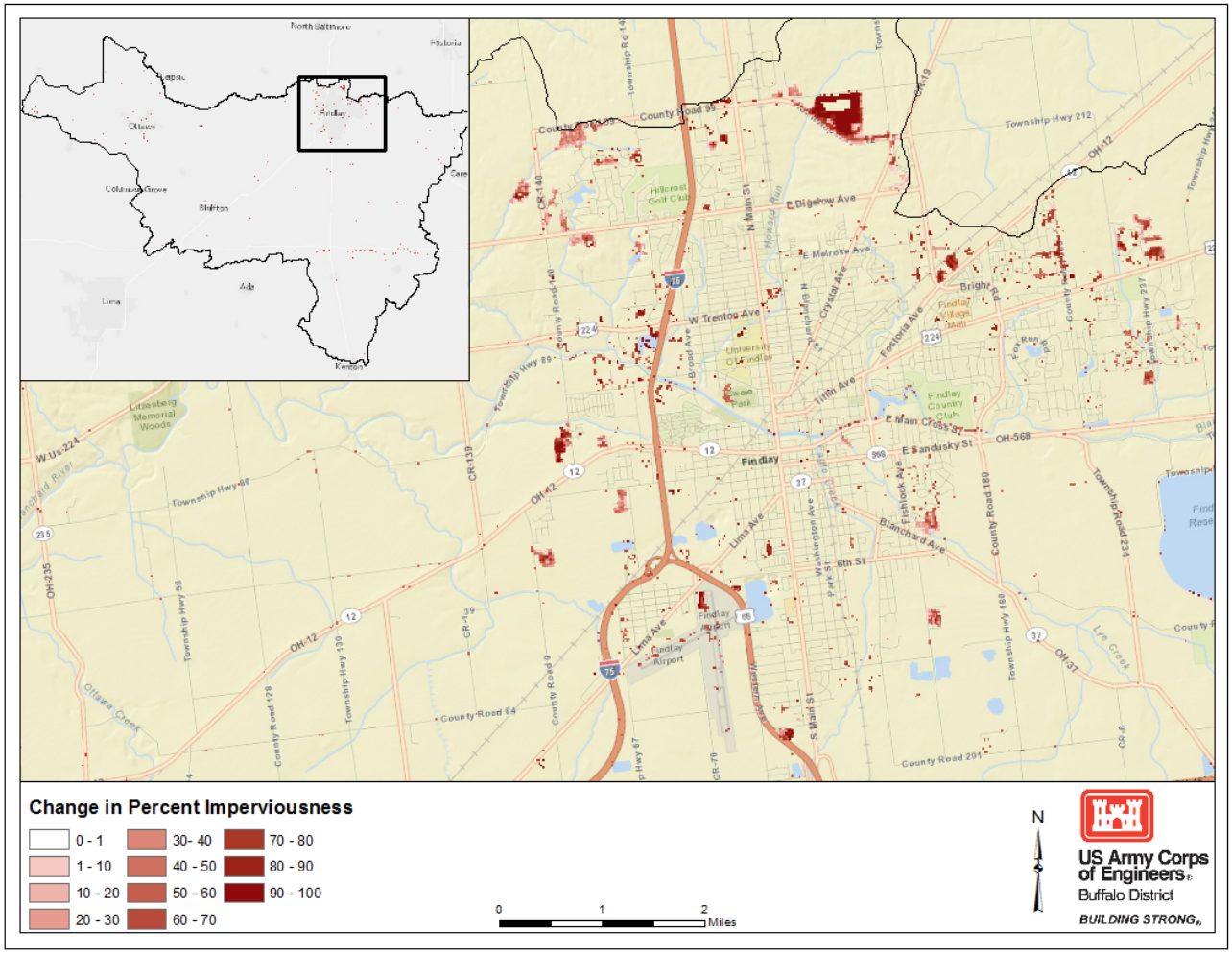


**Figure 5.1b. Percent Change to Impervious Surface Area within the Blanchard Watershed in the City of Findlay (NLCD, 2011)**

Primary crops grown in this predominantly agricultural watershed include corn, soybeans, wheat, alfalfa, hay and tomatoes. Figure 5.1c shows the distribution of agricultural activities throughout the watershed based on the National Agricultural Statistics Service (NASS) database from 2012.

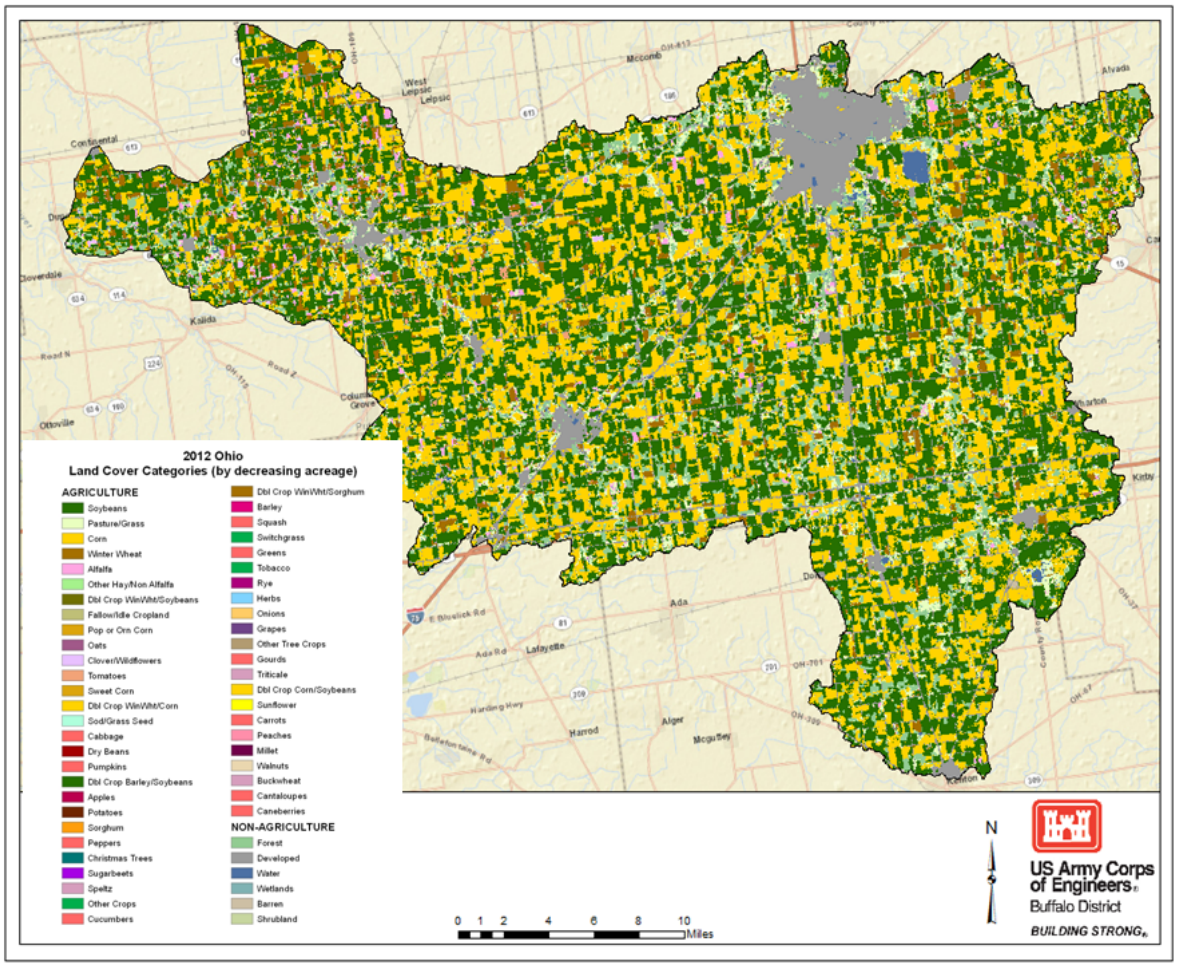


**Figure 5.1c. 2012 Cropland Cover in the Blanchard River Watershed (NASS, 2012)**

Soybeans and corn make up the majority of agricultural products grown within the watershed, which comprise approximately 40 percent and 30 percent of agricultural activities, respectively. Other major agricultural activities include grass/pasture lands at approximately six percent; winter wheat comprises approximately five percent of cropland cover, and alfalfa at one percent (Table 5.1c).

| Table 5.1c. Major Agricultural Practices within the Blanchard | |
|---|---|
| **Cover Type** | **Percentage of Watershed** |
| Corn | 30.35% |
| Soybeans | 40.10% |
| Sweet Corn | 0.01% |
| Ornamental Corn | 0.02% |
| Barley | 0.00% |
| Winter Wheat | 4.66% |
| Double Crop Winter Wheat/Soybeans | 0.17% |
| Oats | 0.02% |
| Alfalfa | 1.18% |
| Other Hay/Non Alfalfa | 0.04% |
| Tomatoes | 0.12% |
| Clover/Wildflowers | 0.06% |
| Grass/Pasture | 5.86% |
| Double Crop Winter Wheat/Corn | 0.01% |

## 5.2 Geology and Soils

*Geology*

Northern Ohio, which includes Hancock County, has been significantly impacted by North American continental glaciation occurring mostly during the formation of the Great Lakes and adjacent Lake Erie (Pleistocene Epoch; URS, 2013). The present study area was once covered by the Laurentide Ice Sheet (LIS), which was up to 10,000 feet thick, and it fully receded by about 8,000 years before present (BP). The LIS extended into Ohio from the Lake Erie Basin as a series of lobes and sub-lobes. Research indicates that the Miami sublobe covered the Blanchard River Watershed study area and may have extended as far south as Cincinnati, Ohio. Morainal deposition processes have significantly impacted the geomorphology of the entire watershed. The Blanchard River Watershed is bounded on the north by the Defiance Terminal Moraine and on the south by portions of the Fort Wayne Terminal Moraine (URS, 2013).

The bedrock below the glacial deposits consists of the Upper Silurian Salina Group, which includes the Salina, Tymochtee, and Greenfield Dolomite Formations, and the Lower Silurian Lockport Dolomite (URS, 2013). Dolomite is quarried in the Findlay area for high quality aggregate. The depth to bedrock below the ground surface is generally very shallow (10-60 feet), meaning that it is a substantial factor in the consideration of some potential project measures that require excavation (URS, 2013).

Three natural karst features (sinkholes) are documented in the watershed in Crawford Township, Wyandot County,. Dolomite and calcareous dolomite underlying the watershed can be prone to the formation of karst features. Areas where glacial drift is less than 20 feet thick will be more susceptible to the formation of solution features than are areas having thicker drift. Large areas

containing thin drift are present in central Hancock County, southern Putnam County, and northeastern Allen County. Although no karst has been documented in these areas, they represent sites that likely exhibit buried karst features (URS, 2013).

*Soils*

The soils of the Blanchard River Watershed were formed from many sources including glacial till, lacustrine and beach deposits, recent alluvium, material weathered from bedrock, and organic material (NRCS, 2008). Key landforms or geomorphology include the river flood plains with alluvium, adjacent terraces, ground moraines, wave-planed ground moraines, ridge or terminal moraines, remnant beach ridges, and lake beds. The soils are heterogeneous relative to grain size ranging from clay to cobble and boulder size, typical of glacial deposits. Soil thicknesses, or conversely bedrock depths, range from less than 10 feet to 60 feet.

Glacial soils cover the watershed and consist of clay and silt, with lesser amounts of sand and gravel (Figure 5.2a). Moraine deposits cover most of the area and have a characteristically flat to gently undulating topography. Lakes once existed east of Findlay, and east and west of Dunkirk which resulted in the deposition of clay-rich material at the surface. Clays in the area are generally medium to very stiff deposits, with low to moderate compressibility. Recent alluvial deposits are anticipated to be localized near the rivers and major streams and to consist of loose to medium dense sands and gravels.

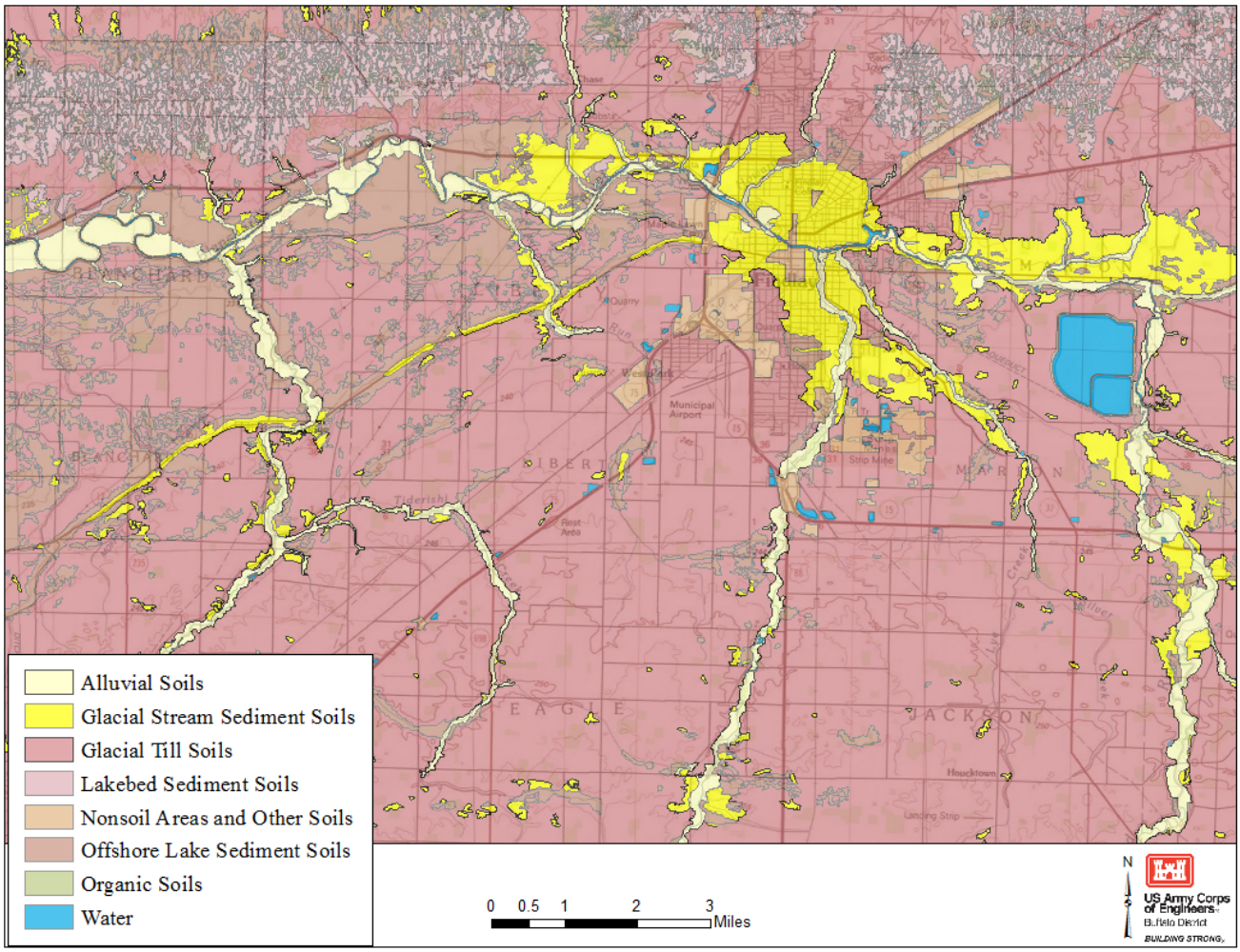


**Figure 5.2a. Surficial soil deposits in the Findlay area (ODNR, 2006)**

According to Geographic Information System (GIS) datasets of mapped soils provided by the Natural Resources Conservation Service (NRCS), approximately 42 percent of the Blanchard River Watershed is mapped as being underlain with either hydric soils or non-hydric soils with hydric inclusions. Pewamo silty clay loam and Paulding clay are the two most extensive hydric soils and cover about 100,600 and 24,100 acres, respectively. Other hydric soils include Hoytville, Latty, Lenawee, Mermill, Millgrove, Millsdale, Pandora, Rensselaer, Sloan, Toledo and Westland soils (NRCS, 2008).

Geospatial data concerning the presence of prime farmland within the project area was collected from the Soil Survey Geographic Database (SSURGO, 2014). Table 5.2 and Figure 5.2.b summarize the occurrence of prime farmland soil types within the Blanchard watershed. See the Environmental Appendix for further information concerning the Farmland Protection Policy Act.

| Table 5.2: Blanchard Watershed Prime Farmland Soils (SSURGO, 2014) | |
|---|---|
| **Prime Farmland Soil Types** | **Area** |
| All areas are prime farmland | 54,037 |
| Not prime farmland | 51,674 |
| Prime farmland if drained | 380,644 |
| Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season | 5,006 |
| Prime farmland if protected from flooding or not frequently flooded during the growing season | 584 |
| Water | 2,268 |

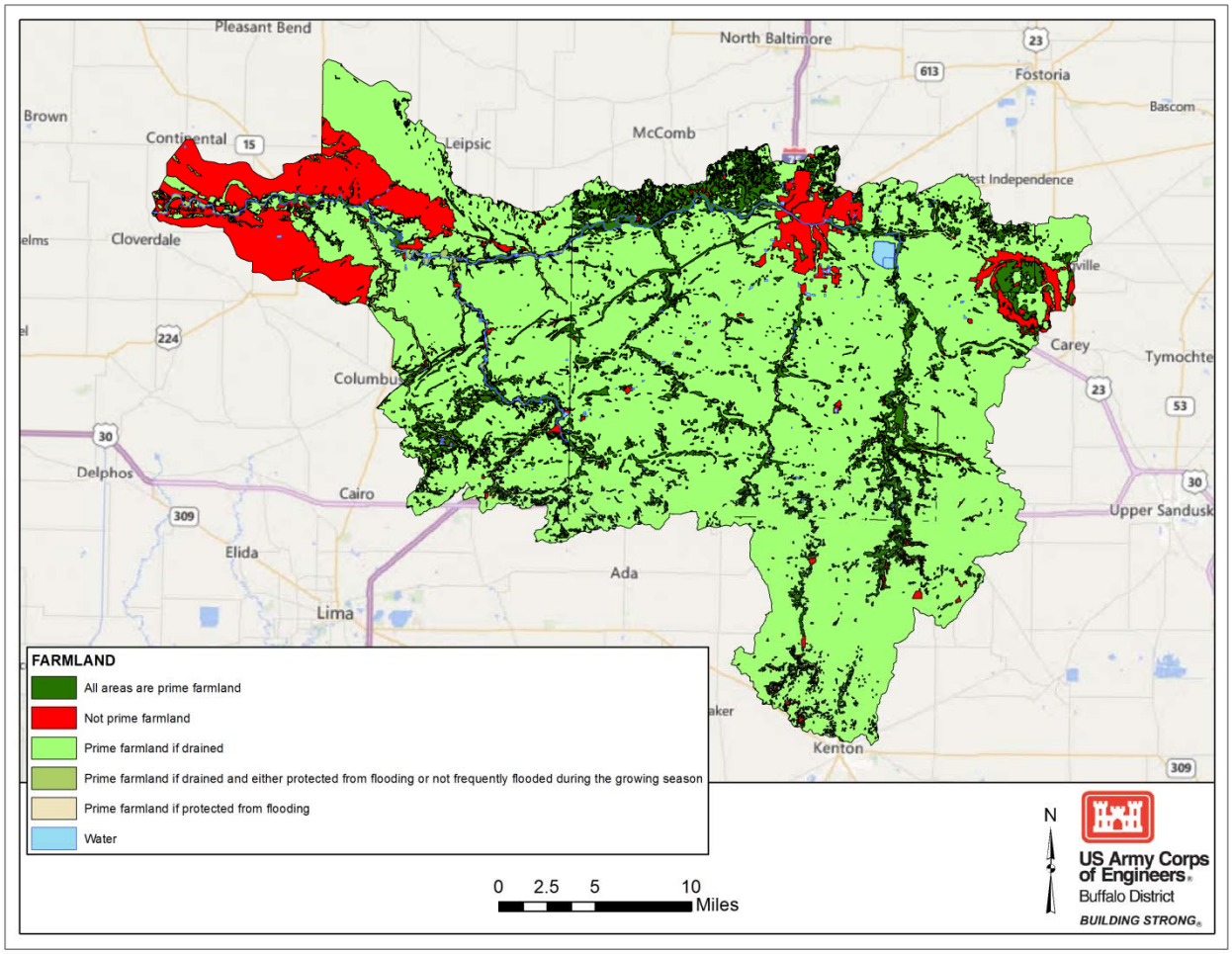


**Figure 5.2b. Spatial Distribution of Farmland Soils within the Blanchard River Watershed (SSURGO, 2014)**

## 5.3 Groundwater

The project area in Findlay is underlain by the regional carbonate bedrock aquifer, commonly underlying glacial till. In addition to glacial till, overlying soils consisting of glacial lake deposits and recent alluvium are widespread. This carbonate bedrock aquifer serves as a primary source of groundwater for much of the area's rural population. Domestic wells in the bedrock aquifer are usually developed at depths less than 150 feet. Overlying the bedrock aquifer is a mantle of glacial till that is not considered an aquifer because of its high content of silt and clay (Smith, 1994). Shallow wells less than 55 feet are often drilled in an attempt to obtain sulfur-free water, but yields less than 10 gallons per minute (gpm) are not uncommon (Schmidt, 1981). Wells developed at depths exceeding 255 feet may produce yields in excess of 50 gpm, but high hardness, hydrogen sulfide, and sulfates may deter use (Calhoun III, 1992).

## 5.4 Streams

The Blanchard River originates in central Hardin County, approximately five miles northwest of Kenton, Ohio (Figure 5.4). It flows in a northerly direction for the first 25 miles into eastern Hancock County, where it turns sharply to the west and flows through the city of Findlay. The 771 square mile Blanchard River Watershed drains into the Auglaize River near the village of Dupont in Putnam County. The Blanchard River Watershed is delineated by the U. S. Geological Survey as 8-digit hydrologic unit code (HUC11) 04100008 and is comprised of six sub-basins (Table 5.4a). These sub-basins contain waters that are designated as Warmwater Habitats (WWH) and Modified Warmwater Habitats with modified channels (MWH-C). Portions of all of these sub-basins are listed on the Section 303(d) of the Clean Water Act list of impaired waters. These waters are considered too polluted or otherwise degraded to meet the Ohio's water quality standards, set forth in Chapter 3745-1 of the Ohio Administrative Code. The list of impairments include: dissolved oxygen; flow alterations; habitat alterations, nitrite/nitrate, nutrients; organic enrichment (sewage) biological indicators; PCB(s) in fish tissue, pathogens; total phosphorus; temperature; and total ammonia (Ohio Environmental Protection Agency [OEPA], 2008).

Table 5.4a. HUCs for the Blanchard River Watershed (National Hydrography Dataset [NHD])

| HUC11 | Water Assessment Unit Description | Size (sq. mi.) |
|---|---|---|
| 04100008 001 | Blanchard River Mainstem (Downstream Dukes Run to Mouth) | 771.0 |
| 04100008 010 | Blanchard River (headwaters to downstream Potato Run) | 140.8 |
| 04100008 020 | Blanchard River (downstream Potato Run to upstream Eagle Creek) | 133.4 |
| 04100008 030 | Blanchard River (upstream Eagle Creek to upstream Ottawa Creek) | 115.0 |
| 04100008 040 | Blanchard River (upstream Ottawa Creek to upstream Riley Creek); excluding Blanchard River Mainstem | 148.9 |
| 04100008 050 | Riley Creek | 85.6 |
| 04100008 060 | Blanchard River (downstream Riley Creek to mouth); excluding Blanchard River Mainstem | 147.3 |

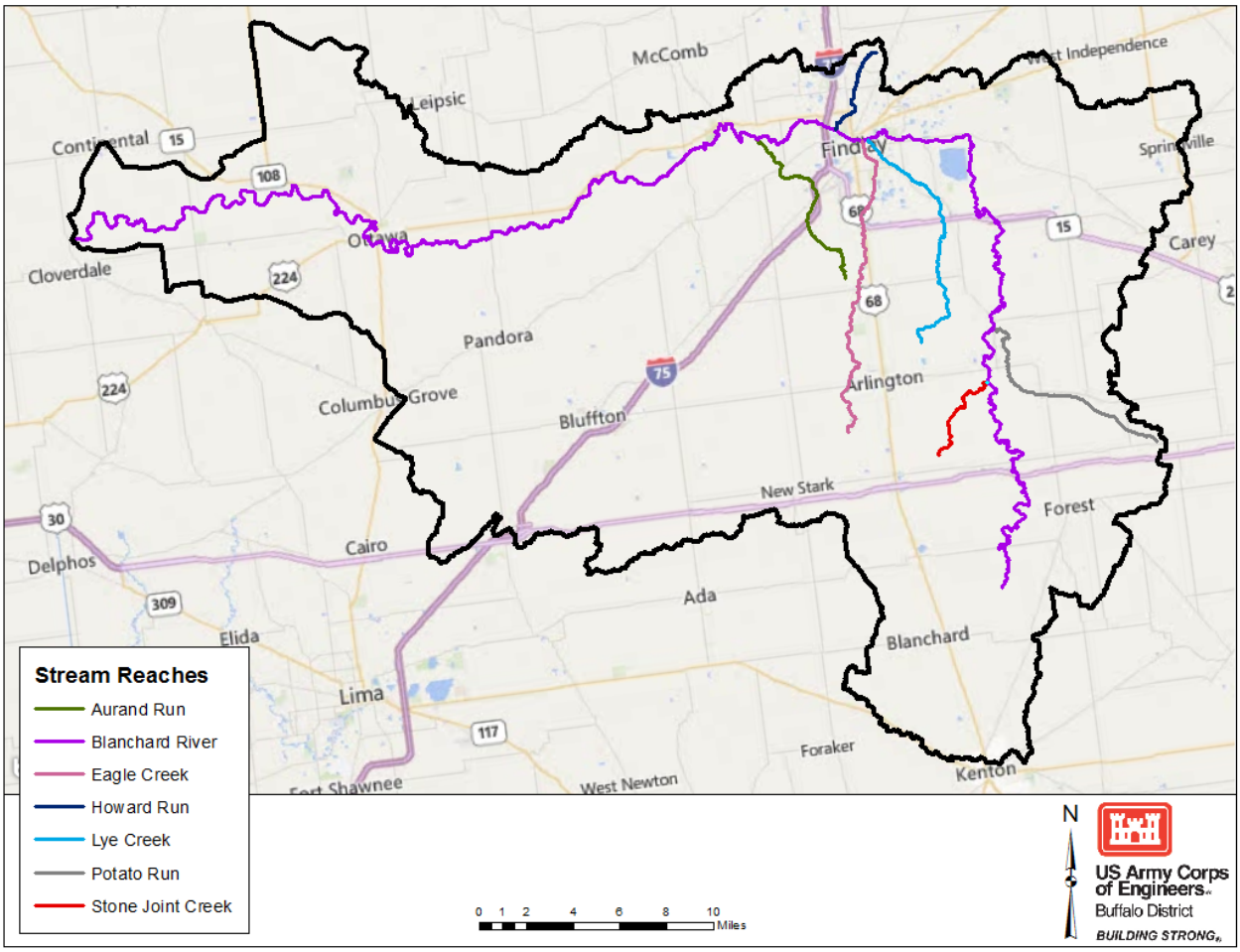


**Figure 5.4. Stream Reaches Included in the Blanchard River Study Area**

Focusing more specifically on the study area around Findlay, there are several reaches of the Blanchard River and several smaller order streams that warrant characterization. These streams are listed in Table 5.4b. The Blanchard River, Aurand Run, Eagle Creek, and Lye Creek are the largest of these waterbodies. Site specific information regarding these streams, such as Qualitative or Headwaters Habitat Evaluation Index (QHEI/HHEI), was not available due to inability to obtain real estate rights-of-entry.

| Table 5.4b. Study Stream Reach Names and Total Lengths (NHD, 2014) | | | |
|---|---|---|---|
| **Stream Name** | **Reach Name** | **Channel Length (miles)** | **Channel Length (feet)** |
| Aurand Run | | 9.1 | 47,956 |
| Blanchard River | Forest | 8.9 | 47,174 |
| | Mt Blanchard | 3.1 | 16,631 |
| | Above Findlay | 17.9 | 94,251 |
| | Eagle-Lye | 0.1 | 596 |
| | Findlay | 1.2 | 6,308 |
| | Below Findlay | 5.5 | 29,233 |
| | Gilboa | 28.2 | 148,709 |
| | Auglaize | 22.0 | 116,011 |
| *Subtotal* | | *86.9* | *458,914* |
| Eagle Creek | | 16.3 | 86,039 |
| Howard Run | | 3.8 | 20,020 |
| Lye Creek | | 15.1 | 79,637 |
| Potato Run | | 10.5 | 55,353 |
| Stone Joint Creek | | 5.6 | 29,683 |
| *Total All Streams* | | *147.3* | *777,601* |

## 5.5 Floodplains

The city of Findlay and Hancock County are impacted by flows from the Blanchard River, Eagle Creek and Lye Creek. While flooding can be isolated to the listed river and creeks, flooding in the watershed is typically due to overbank flow and is experienced on an almost annual basis within the watershed. Frequent flooding by overland flow damages commercial and residential structures as well as agricultural lands. Due the area's flat terrain, the low areas along both sides of the Blanchard River both upstream and downstream of the city of Findlay are the first areas to be impacted by flooding. Minor and major flood stages for the Blanchard River occurs when the USGS Findlay gage, located downstream of Findlay, reaches 11 and 13 feet, respectively. The rise and fall of the crests on the Blanchard River generally last for about two or three days, and can last longer during severe flood events, and typically occurs within one to two days after a major rain event. Figure 5.5 illustrates the 0.01 annual chance event (100-year) floodplain for the Findlay area.

The structure inventory to evaluate flood damages analyzed in the study area were based on those incurred within the inundation boundary for the 0.002 annual chance event (500-year flood event). It is from within this boundary that the inventory of affected properties is developed, and no benefits or damages are computed for properties outside it. For this reason, the floodplain can be seen as a focused geographic scope for the economic analysis. However, all impacts of proposed measures or alternatives, direct or indirect, are not necessarily limited to this area.

The population of the structure inventory is estimated to be approximately 11,352 (with roughly

10,005 persons in Findlay and 1,348 in Ottawa). This estimate was generated based on applying the US Census Bureau's estimates of population per household in Findlay and Ottawa (2.14 and 2.50, respectively) to the total number of residential properties in each community (4,675 in Findlay and 539 in Ottawa).

The city of Findlay and Hancock County participate in the National Flood Insurance Program (NFIP) which is administered by the Federal Emergency Management Agency (FEMA). The city of Findlay's initial acceptance date into participation in the NFIP was on January 23, 1974 and Hancock County began participation on December 30, 1977. As part of the Map Modernization Program, FEMA migrated to a county-wide map production process and the maps for Hancock County, including the city of Findlay, were updated in 2011. The floodplains for the Blanchard River, and Lye and Eagle Creeks were updated as part of the FEMA Map Modernization process.


**Figure 5.5. Model Simulated 0.01 ACE (100 Year Event) Flood Plain in Findlay and surrounding vicinity.**

## 5.6 Wetlands

A large portion of the Blanchard River Watershed lies within the historic range of the Great Black Swamp (Figure 5.6a). Originally 100 miles long and 20 to 30 miles wide, the swamp was located within the Maumee River Watershed but by 1900 virtually the entire Great Black Swamp was drained and converted to agriculture. For every mile of natural stream in the watershed presently, it is estimated that there are three miles of man-made ditches (URS, 2013). This change in the landscape and land use is a major contributor to the deteriorated water quality and flooding issues in the watershed today.

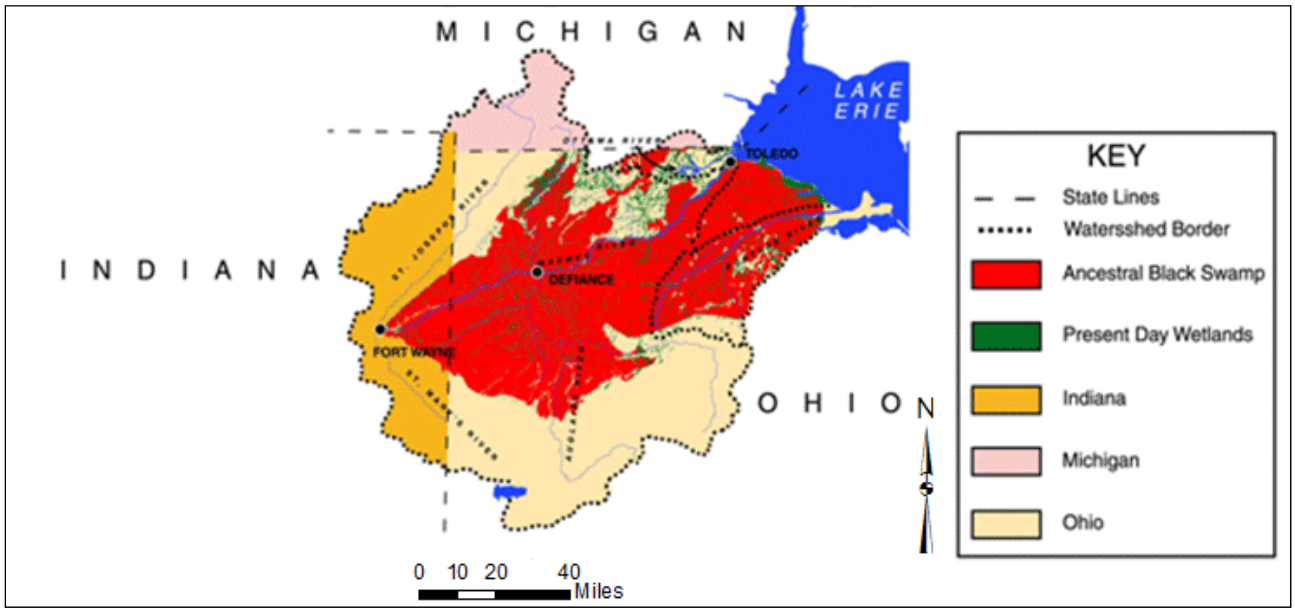


**Figure 5.6a. Historic Range of the Great Black Swamp (SJWI, 2014)**

During September and October 2010 Van Horn, Hoover & Associates performed wetland delineations in portions of the study area. However, as a result of subsequent changes to the study area and measures that have been screened out and added, the area of the recommended alternative has generally not been delineated. Because of an inability to access all properties, wetland delineations were not able to be performed in most of the area of the recommended alternative. For these areas, only a desktop analysis was performed using existing information, such as National Wetland Inventory (NWI) and Ohio Wetland Inventory (OWI) mapping, soil survey information, land use maps, and aerial photographs. The majority of the unsurveyed areas are agricultural and therefore not considered wetland. However, where woodlots were encountered in combination with hydric soils they were conservatively assumed to be wetland and ground truth of this assumption will occur at a later date, either during or after the completion of the feasibility study. Rights of entry will be required to perform field wetland verification surveys.

Where wetland delineations were able to be completed, the Ohio Rapid Assessment Method

version 5.0 (ORAM) was used to assign a qualitative value for each wetland (Mack, 2001). Table 5.6a shows the number and acreage of wetlands included within each ORAM category. There are three main ORAM categories into which wetlands are placed:

> **Category 1 wetlands –** low quality wetlands that support minimal wildlife habitat, and minimal hydrological and recreational functions and do not provide critical habitat for threatened and endangered species or contain rare, threatened or endangered species;
>
> **Category 2 wetlands –** medium quality wetlands that support moderate wildlife habitat, or hydrological or recreational functions and are dominated by native species but generally without the presence of, or habitat for, rare, threatened or endangered species. Category 2 wetlands also include a sub category of wetlands that are degraded but have a reasonable potential for reestablishing lost wetland functions;
>
> **Category 3 wetlands** – are high quality wetlands that have superior habitat, or superior hydrological or recreational functions. They are typified by high levels of diversity, a high proportion of native species, and/or high functional values. Category 3 wetlands include wetlands which contain or provide habitat for threatened or endangered species, are high quality mature forested wetlands, vernal pools, bogs, fens, or which are scarce regionally and/or statewide (Mack, 2001).

Due to the functions and values that Category 3 wetlands possess, permit requirements for impacts to Category 3 systems are quite rigorous and public need must be demonstrated.

Table 5.6a. Partial Summary of Wetlands around Findlay **

| ORAM Category | Number of Wetlands | Acreage by Category |
|---|---|---|
| 1 | 1 | 0.06 |
| 2 | 37 | 18.91 |
| 3 | 7 | 2.85 |
| NA * | 6 | 0.22 |
| *Totals* | *51* | *22.03* |

* An "NA" was listed as the ORAM Category for ponds and systems that were 0.1 acres or less in size.
** Wetland areas that still occur within the current study area.

A total of 51 wetlands were delineated around Findlay that are still within the current study area, totaling approximately 22 acres. Of these, seven were listed as Category 3 wetlands, totaling about three acres. Delineated wetland areas and their ORAM scores are depicted in Figure 5.6b.

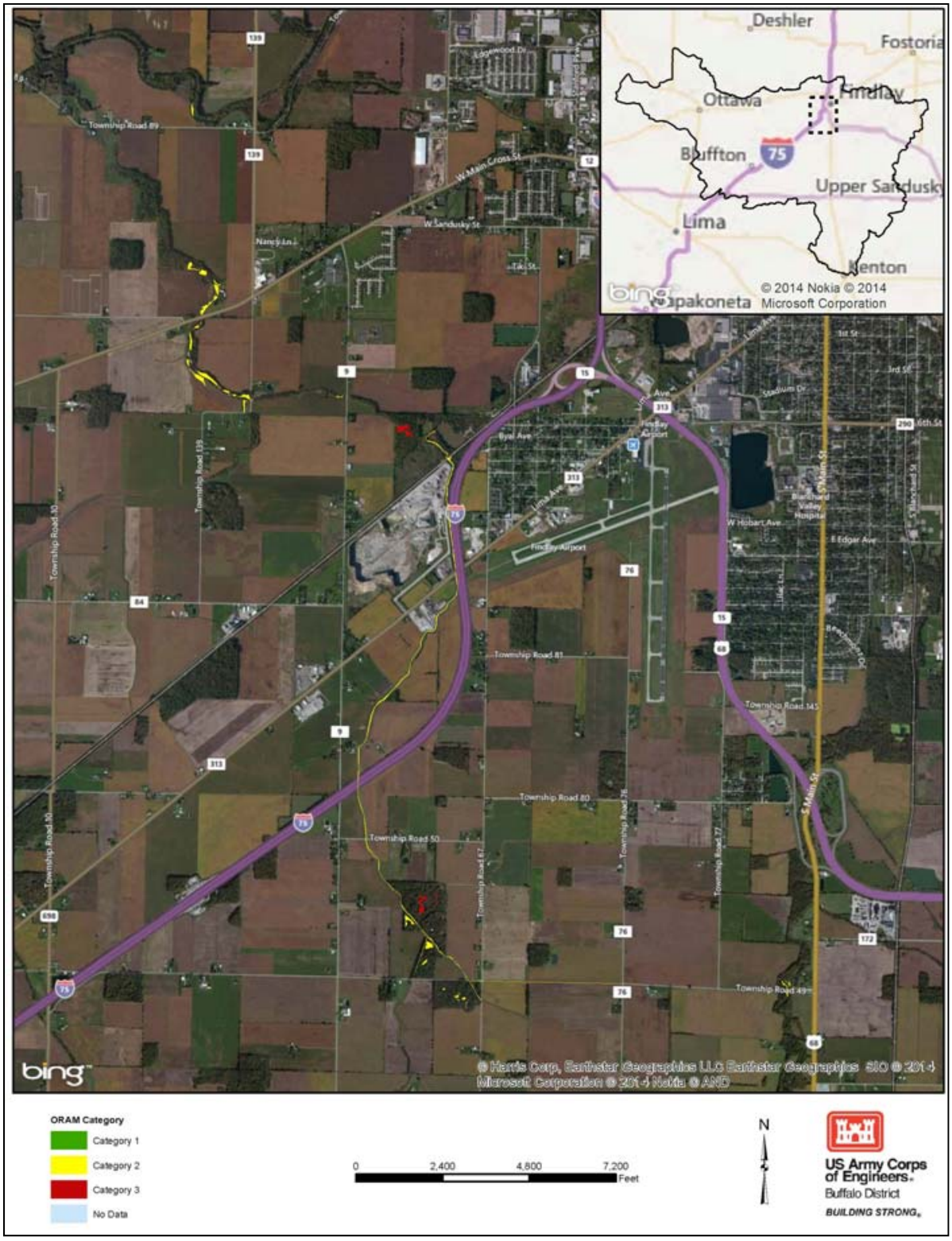


**Figure 5.6b. Delineated wetlands in the Findlay area. Not all areas within the study were delineated.**

The NWI and OWI also provided wetland information for the entire Blanchard River Watershed. Table 5.6b lists the wetland types and acreages for the Blanchard Watershed based on the NWI and OWI. Figures 5.6c and 5.6d outlined wetlands within the vicinity of the project area based on NWI and OWI coverages, respectively. The OWI data was last updated in 1985 and may not accurately reflect the present extent or type of wetland acreage occurring within the Blanchard Watershed today. The NWI and OWI information is illustrated in Figures 5.6c and 5.6d, respectively.

To avoid double counting of wetlands between the two datasets, a layer was created in ArcGIS which reclassified any overlapping areas as NWI wetlands and erased these areas from the OWI area. Thus, the approximate acreage of wetlands within the watershed is 6,885 acres (NWI and OWI combined). This amount separates out the wetland acreage designated by both the NWI and OWI maps and counts only the NWI acreage (as it is the more recently generated coverage) so as not to double count wetland area. Additionally, the OWI has a category for "woods on hydric soil", which includes an additional 9,310 acres with the potential to be wetlands but which have not been officially identified as such. As mentioned previously, these areas are considered wetlands within our project area at this point until field surveys can be conducted to determine the actual amount of wetlands in these areas.

| Table 5.6b. Wetlands within the Blanchard | |
|---|---|
| **National Wetland Inventory** | |
| **Wetland Description** | **Acres** |
| Freshwater Emergent Wetland | 996.40 |
| Freshwater Forested/Shrub Wetland | 4917.29 |
| *Total* | *5913.69* |
| **Ohio Wetland Inventory** | |
| **Wetland Description** | **Acres** |
| Farmed Wetland | 234.98 |
| Shallow Marsh | 281.04 |
| Shrub/scrub Wetland | 239.88 |
| Wet Meadow | 215.79 |
| *Total* | *971.69* |

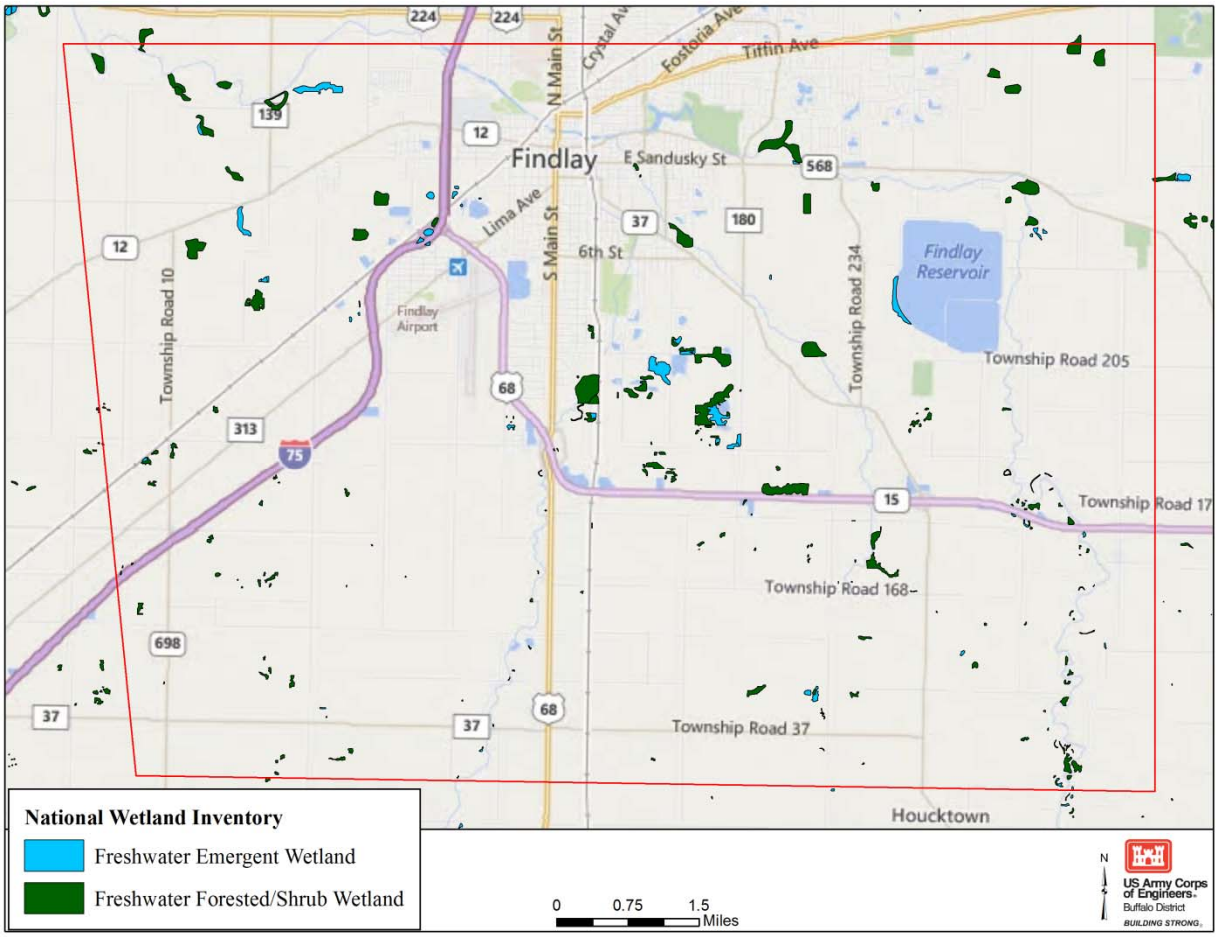


**Figure 5.6c. Wetlands in the vicinity of the study area based on NWI data (USFWS, 2015).**

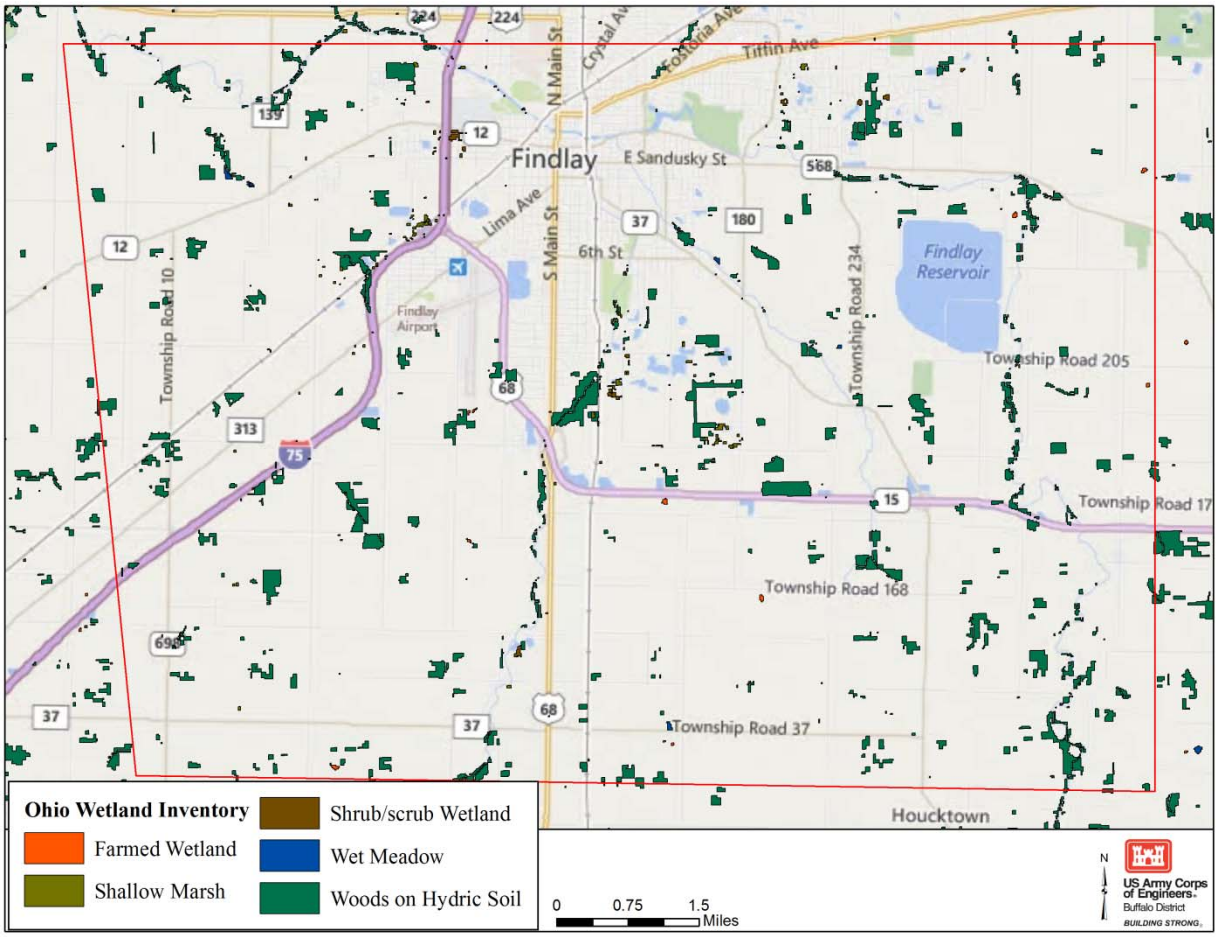


**Figure 5.6d. Wetlands in the vicinity of the study area based on OWI data (ODNR, 2015).**

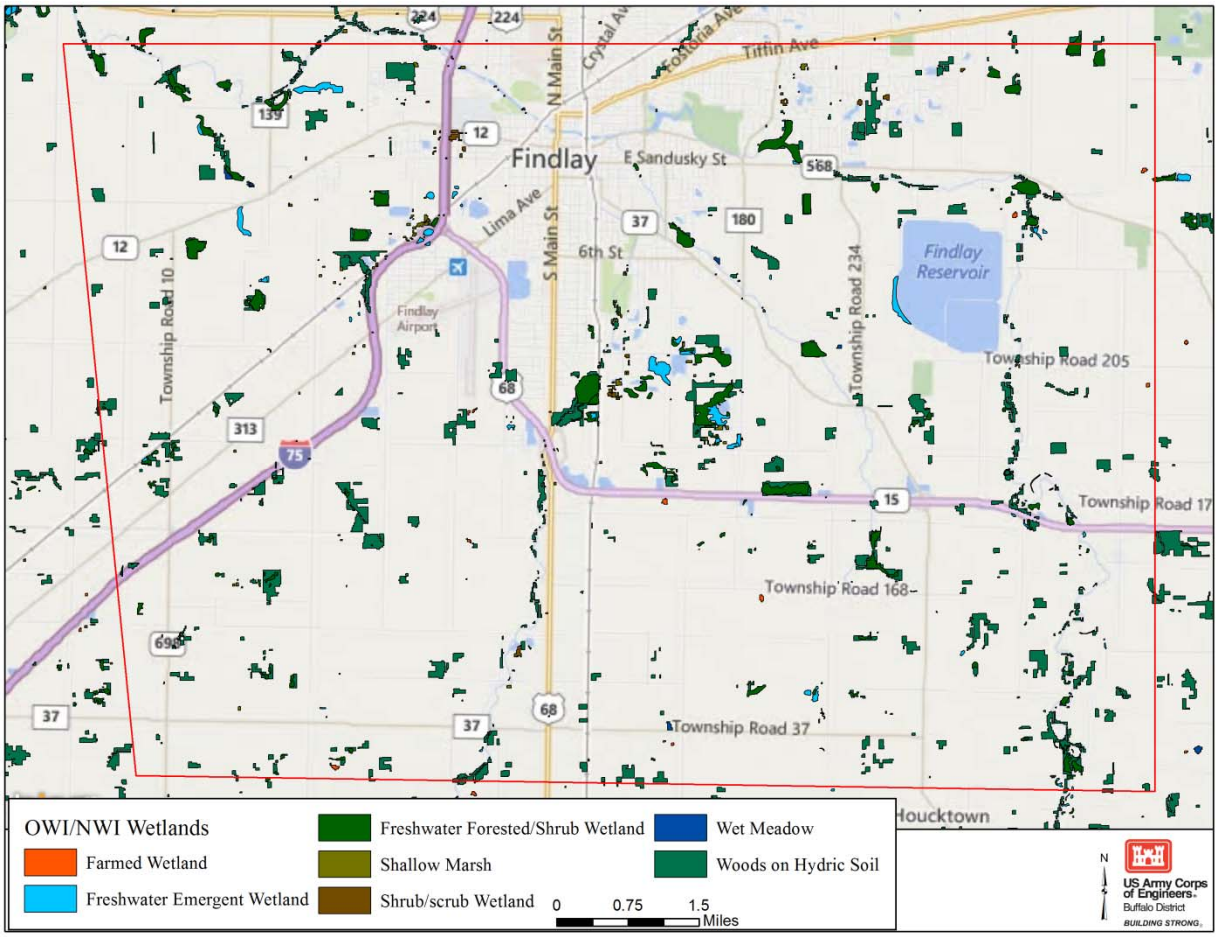


**Figure 5.6e. Wetlands in the vicinity of the study area based on NWI and OWI data (ODNR, 2015; USFWS, 2015).**

## 5.7 Vegetation

The Blanchard River Watershed lies within the Eastern Corn Belt Plains and Huron/Erie Lake Plains Ecoregions (National Atlas, 2013). The Eastern Corn Belt Plains are primarily composed of rolling till plain with local end moraines (Bailey, 1995). The Huron/Erie Lake Plain is a broad, fertile, relatively flat plain with soil drainage that was generally poorer than in the adjacent Eastern Corn Belt Plains. Elm-ash swamp and beech forests were dominant in this subecoregion. Today, most of the area has been cleared and artificially drained and contains highly productive farms producing corn, soybeans, livestock, and vegetables; urban and industrial areas are also present. Woodlands, wetlands and grasslands are limited to approximately 10 percent of total land cover within the watershed (NRCS, 2008). The remaining forested areas in the watershed are primarily scattered woodlots that range from five to more than 50 acres in size, with the average size being approximately 20 acres. Predominant tree species include oaks (red, white, bur, swamp white, and chinkapin), green and white ash, maples (red, sugar, silver, and boxelder), basswood, elm, black walnut, honeylocust, hackberry and other

hardwoods. Aside from the woodlots, many of the forested areas are found along streams in the watershed at locations that were not as easily developed as the upland areas. Nearly all of the forested areas in the Blanchard River Watershed are privately owned, with the small percentage of publicly owned forests belonging primarily to the counties and their respective park districts. There are no state or federally owned forest lands in the watershed (URS, 2013).

## 5.8 Wildlife and Aquatic Resources

*Wildlife Resources*

Wildlife habitat in the watershed is heavily influenced by the predominance of land devoted to row crops and original native vegetation, for the most part, has been removed. Most of the agricultural land provides marginal habitat for common edge or disturbance adapted species. In addition, lack of winter cover or food for resident species is severely limited. Table 5.8 describes the general condition of wildlife habitat in the watershed.

Wildlife species that are expected to occur within the project area based on the habitat available include rabbits, raccoons, white-tailed deer, squirrels, and various grassland birds. A relatively low diversity of songbirds (e.g., warblers and vireos) as well as some smaller mammals (e.g., voles and mice) are expected to occur within the remnant forested patches that occur within the project area. Some of the more common amphibians and reptiles expected to occur within the riparian areas of the project area include American toads, western chorus frogs, green frogs, bull frogs, garter snakes, and painted turtles. Twenty-nine species of freshwater mussels are known to occur in the Blanchard River and Eagle Creek (Hoggarth and Burgess, 2009; USFWS, 2014a).

| Table 5.8. Wildlife Habitat Availability and Condition (NRCS, 2008) [1] | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Area/Length Of Feature within the Watershed** | **Much Less Than Typical State Watershed** | **Less Than Typical State Watershed** | **Comparable to Typical State Watershed** | **Better Than Typical State Watershed** | **Much Better Than Typical State Watershed** |
| Stream Habitat | 1,255,619 Linear Feet | N/A | Condition degraded in many places | N/A | N/A | N/A |
| Grassland Habitat | 12,858 Acres | Limited extend Low quality | N/A | N/A | N/A | N/A |
| Wetland Habitat | 1,713 Acres | Limited extent Low quality | N/A | N/A | N/A | N/A |
| Forest Habitat | 27,710 Acres | Limited extent Moderate quality | N/A | N/A | N/A | N/A |

[1]Condition designations based on information from Ohio EPA Water Quality Reports, Ohio Division of Wildlife Comprehensive Wildlife Plan, qualitative review of land cover information using broad wildlife habitat models, and expert opinion.

## 5.9 Threatened and Endangered Species

According to the United States Fish and Wildlife Service (USFWS), there are four Federally-listed and candidate species within Hancock County (USFWS, 2014b). While the bald eagle (*Haliaeetus leucocephalus*) is no longer a Federally-listed species, it is afforded protection under both the Bald & Golden Eagle Protection Act and the Migratory Bird Treaty Act. Table 5.9a outlines these species and provides general information concerning habitat preferences.

The USFWS provided a Fish and Wildlife Coordination Act Report (F&WCAR) on June 25, 2014 (the full document is available in the Environmental Appendix). This document summarizes the fish and wildlife resources within the project area, including Federally- and state-listed species, potential impacts to these resources through project implementation as well as recommendations to avoid and mitigate for impacts to fish and wildlife. The report cites that the entire project area occurs within the range of Indiana bat (*Myotis sodalis*) and the northern long-eared bat (*Myotis septentrionalis*) as well as the rayed bean (*Villosa fabalis*) and the clubshell (*Pleurobema clava*) mussels. Other notable species assemblages outlined in the report include nesting bald eagles and 29 species of freshwater mussels. The report describes the findings of an OEPA report released in 2007 for the Blanchard Watershed. This OEPA report describes that portions of the Blanchard River occurring within the project area and Eagle Creek presently harbor depressed fish and macroinvertebrate assemblages (OEPA, 2007). Aurand Run, on the other hand, was reported as harboring good fish communities, with pollution-sensitive darter and sculpin species present (OEPA, 2007).

ODNR provided input to the F&WCAR that outlined state protected species that occur within the study area (ODNR, 2014; see the Environmental Appendix for the ODNR letter attachment to

the Coordination Act Report). The ODNR outlines nine protected species comprised of four different taxa (Table 5.9b).

Table 5.9a. Known Locations and Habitats for Federally-listed, Proposed and Candidate Species Occurring in Hancock County, Ohio (USFWS, 2014b)

| Species | Federal Status | Location (County) | Habitat |
|---|---|---|---|
| **Mussels** | | | |
| Clubshell mussel (*Pleurobema clava*) | Endangered | Hancock | Riffles and runs of small perennial rivers and streams with coarse sand, gravel and/or rock substrate. |
| Rayed bean mussel (*Villosa fabalis*) | Endangered | Hancock | Riffles and runs of headwater streams and perennial rivers with sand and/or rock substrate. |
| **Birds** | | | |
| Bald eagle (*Haliaeetus leucocephalus*) | Protected under the B&GEPA and MBTA[1] | Hancock | Summer near large lakes and reservoirs. Nest in super canopy trees typically near large bodies of water. |
| **Mammals** | | | |
| Indiana bat (*Myotis sodalis*) | Endangered | Hancock | Hibernate in caves and mines. Summer roost in live or dead trees with peeling (exfoliating) bark, cracks, or crevices. Stream corridors, riparian areas, and upland woodlots provide forage sites. |
| Northern long-eared bat (*Myotis septentrionalis*) | Candidate | Hancock | Hibernates in caves and mines. Autumn swarms in surrounding wooded areas. Late spring and summer forages and roosts in upland forests. |

[1] B&GEPA – Bald & Golden Eagle Protection Act, MBTA – Migratory Bird Treaty Act

| Table 5.9b. State-listed species that may occur within the Blanchard project area (ODNR, 2014) | | |
|---|---|---|
| **Species** | **State Status** | **Habitat** |
| **Mussels** | | |
| Clubshell mussel (*Pleurobema clava)* | Endangered | Within riffles and runs of small perennial rivers and streams with coarse sand, gravel and/or rock substrate. |
| Rayed bean mussel (*Villosa fabalis)* | Endangered | Riffles and runs of headwater streams and perennial rivers with sand and/or rock substrate. |
| Purple lilliput (*Toxolasma lividus*) | Endangered | Headwaters of small to mediums-sized rivers, occurs in a range of substrates types within riffles or near riffles. |
| Elktoe (*Alasmidonta marginata*) | Special Concern | Usually in smaller streams although can occur in medium to large streams exhibiting swift currents and substrates ranging from sand to gravel. |
| Salamander mussel (*Simpsonaias ambigua*) | Special Concern | Medium to large rivers and lakes with sand and silt substrates usually occurring under large, flat stones. Often found in association with mudpuppy salamanders (*Necturus maculosus*). |
| Deertoe (*Truncilla truncata*) | Special Concern | Habitat generalist, although most common in medium-sized rivers in fine gravel mixed with mud and sand. |
| **Birds** | | |
| Bald eagle (*Haliaeetus leucocephalus)* | Protected under the B&GEPA and MBTA[2] | Summer near large lakes and reservoirs. Nest in super canopy trees typically near large bodies of water. |
| **Mammals** | | |
| Indiana bat (*Myotis sodalis)* | Endangered | Hibernate in caves and mines. Summer roost in live or dead trees with peeling (exfoliating) bark, cracks, or crevices. Stream corridors, riparian areas, and upland woodlots provide forage sites. |
| **Plants** | | |
| Rock elm (*Ulmus thomasii)* | Potentially Threatened | Variety of habitats including scrub/shrub areas, grasslands and fields. |

## 5.10 Air Quality

In accordance with Clean Air Act (CAA) requirements, air quality in a given region is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources but also surface topography, the size of the topographical "air basin," and the prevailing meteorological conditions.

Under the CAA, USEPA has developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to affect human health and the environment. NAAQS represent the maximum allowable concentrations for ozone ($O_3$) that is measured as either volatile organic compounds (VOCs) or total nitrogen oxides ($NO_x$), carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur oxides ($SO_2$), respirable

particulate matter (including particulate matter equal or less than 10 microns in diameter [$PM_{10}$] and particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$], and lead (Pb) (40 CFR Part 50). CAA also gives the authority to states to establish air quality rules and regulations. The state of Ohio has adopted the NAAQS and promulgated additional State Ambient Air Quality Standards (SAAQS) for criteria pollutants. Table 5.10a presents a list of NAAQS and SAAQS.

Table 5.10a. National and State Ambient Air Quality Standards

| Pollutant | Averaging Time | Primary Standard | | Secondary Standard |
|---|---|---|---|---|
| | | Federal | State | |
| CO | 8-hour | 9 ppm | Same | - |
| | 1-hour | 35 ppm | Same | - |
| Pb | Rolling 3-month Average | 0.15 $\mu g/m^3$ | Same | 0.15 $\mu g/m^3$ |
| $NO_2$ | 1-hour | 100 ppb | Same | - |
| | Annual Arithmetic Mean | 53 ppb(2) | Same | 53 ppb(2) |
| $PM_{10}$ | 24-hour | 150 $\mu g/m^3$ | Same | 150 $\mu g/m^3$ |
| $PM_{2.5}$ | Annual Arithmetic Mean | 12 $\mu g/m^3$ | Same | - |
| | Annual Arithmetic Mean | - | Same | 15 $\mu g/m^3$ |
| | 24-hour | 35 $\mu g/m^3$ | Same | 35 $\mu g/m^3$ |
| $O_3$ | 8-hour | 0.075 ppm(3) | Same | 0.075 ppm(3) |
| $SO_2$ | Annual Arithmetic Mean | - | 0.030 ppm | - |
| | 1-hour | 75 ppb(4) | Same | - |
| | 3-hour | - | Same | 0.5 ppm |
| | 24-hour | - | 0.14 ppm | - |

Sources: USEPA, October 2011, Ohio Administrative Code (OAC) Chapter 3745-25

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
(2) The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Areas that do not meet NAAQS are designated as being in "nonattainment" for that criteria pollutant. Based on NAAQS or SAAQS, Hancock County is designated as an attainment area for all criteria pollutants (USEPA, 2014a).

Table 5.10b presents permitted stationary sources of air pollution that have been identified within the study area (USEPA, 2015). Mobile sources of air emissions also contribute to ambient air quality within the study area. These sources include the commercial and personal use of motor vehicles along the road network, the operation of non-road vehicles and engines (including railroad locomotives and watercraft), and the operation of diesel engines including both heavy and light agricultural and construction equipment. In addition to the aforementioned criteria pollutants, these sources can also be expected to contribute air toxics (i.e., chemicals that are known or suspected to be hazardous to human health) and greenhouse gas emissions (**http://www.epa.gov/otaq/**).

| Table 5.10b. Permitted Stationary Sources of Air Pollution Identified within the Study Area (USEPA Envirofacts, 2014) | | | | | |
|---|---|---|---|---|---|
| **Facility** | **Address (1)** | **Address (2)** | **Description** | **State Registration Number** | **Compliance Status Description** |
| Ashland Inc. | 709 Glessner Av | Findlay, OH 45840 | Petroleum Refineries | 332010020 | In Violation |
| Ball Metal Beverage Container Corp. | 12340 Township Road 99 E | Findlay, OH 45840-9736 | Metal Can Manufacturing | 332000023 | In Compliance |
| Biltrite Rubber Inc. | 1300 Morrical Blvd | Findlay, OH 45840 | Rubber Manufacturing | 332010017 | In Compliance |
| Car Craft Collision (Findlay Car Craft Collison LTD) | 225 E Front St | Findlay, OH 45840 | Automotive Body, Paint, and Interior Repair and Maintenance | 332012023 | In Compliance |
| Cooper Tire Co. | 701 Lima Av | Findlay, OH 45840-2388 | Tire Manufacturing (except inner tubes) | 332010003 | In Compliance |
| Createc Plant #2 | 1900 Industrial Dr | Findlay, OH 45840 | Polystyrene Foam Product Manufacturing | 332010202 | In Compliance |
| Dow Chemical Co. | 3441 N Main St | Findlay, OH 45840-4299 | Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing | 332010121 | In Compliance |
| Findlay Industries Inc.- Gardner Molded Products | 5500 Fostoria Rd | Findlay, OH 45840-8739 | Motor Vehicle Parts Manufacturing | 332010090 | In Compliance |
| Findlay Industries Inc. - Findlay Division (Permanently Closed) | 2100 Fostoria Rd | Findlay OH 45840-8758 | Vehicle Electrical and Electronic Equipment Manufacturing | 332010055 | In Compliance |
| Hisan Inc. (Sanoh America, Inc.) | 1849 Industrial Dr | Findlay, OH 45840-5458 | Motor Vehicle Parts Manufacturing | 332010063 | In Violation |
| Intersil Corp. Findlay Operations (Harris Semiconductor) (Permantly Closed) | 1700 Fostoria Rd | Findlay, OH 45840-6240 | Semiconductor and Related Device Manufacturing | 332010016 | In Compliance |
| Marathon Ashland Peroleum LLC | 1005 Lima Av | Findlay. OH 45840 | General Automotive Repair | 332010209 | In Compliance |
| National Lime & Stone Co.- Findlay | 9860 County Road 313 | Findlay, OH 45840-9003 | Crushed and Broken Limestone Mining and Quarrying | 332010059 | Unknown Compliance Status |
| National Lime and Stone Co. (Permanently Closed) | 551 Lake Cascades Pkwy | Findlay, OH 45839 | Crushed and Broken Limestone Mining and Quarrying | 332960003 | In Compliance |
| Nissin Brake Ohio Inc. (Findlex Corp.) | 1901 Industrial Dr | Findlay, OH 45840 | Motor Vehicle Brake System Manufacturing | 332010076 | In Compliance |
| OHM Remediation Services Corp. (O H Materials) | 16406 USR 224 E | Findlay, OH 45839 | Gasoline Station | 332010051 | In Compliance |
| Rowmark Inc. | 2040 Industrial Dr | Findlay, OH 45840-5443 | Rubber Product Manufacturing | 332010217 | In Compliance |
| Sausser Steel Co. | 230 Crystal Av | Findlay, OH 45840-4796 | Fabricated Structural Metal Manufacturing | 332010043 | In Compliance |
| Spectrulite Consortium Inc. (Magnesium Elektron North America Inc.) | 115 Stanford Pkwy | Findlay, OH 45840-1731 | Metal Coating, Engraving (except Jewelry and Silverware), Allied Services | | In Compliance |
| Stoneco Plant No. 114 | 10148 County Road 313 | Findlay, OH 45840 | Asphalt Paving Mixture and Block Manufacturing | 66490009 | In Compliance |
| Trinity Difco Property (Plant No. 374) | 1501 N Main St | Findlay, OH 45840-3752 | Railroad Rolling Stock Manufacturing | 332010119 | In Compliance |

## 5.11 Water Quality

Presented in this section is an overview of existing water quality problems in the Blanchard River Watershed. Much of the information presented in this section is based upon the Biological and Water Quality Study (OEPA, 2007) and the Total Maximum Daily Load (TMDL) for the Blanchard River Watershed (OEPA, 2009).

*Water Quality Characteristics*

The six sub-watersheds of the Blanchard River assessed in 2005 failed to reach attainment of the warm water habitat aquatic life use designation in the Ohio Water Quality Standards (Table 5.11). However, the lower 32 miles of the river main stem are in full attainment, but are threatened by lower water quality in their upstream tributaries (OEPA, 2007). Primary causes of impairment in the Blanchard River Watershed are excess nutrients as a result of agricultural practices, sedimentation, poor habitat quality, organic substances and high stream temperatures.

Table 5.11. Attainment Status of Stream Sampling Sites Per Hydrologic Unit (HUC; Source, OEPA, 2007)

| HUC | Full | Non | Partial |
|---|---|---|---|
| Headwaters | 32% | 64% | 4% |
| Outlet/Lye Creek | 25% | 50% | 25% |
| Eagle Creek | 37% | 37% | 26% |
| Ottawa Creek | 33% | 44% | 23% |
| Riley Creek | 17% | 61% | 22% |
| Cranberry Creek | 9% | 73% | 18% |
| Blanchard River (lower main stem) | 100% | | |

Although numerous causes of water quality impairment in the Blanchard River watershed were identified by the OEPA in the biological and water quality study report (OEPA, 2007), the most prevalent causes of impairment included nutrient enrichment (including phosphorus and nitrates/nitrites), organic enrichment, flow alteration, habitat alteration, siltation, presence of excessive pathogens, and low dissolved oxygen. In addition to the combined sewer overflows (CSOs) and septic systems further described below, sources of these impairments have been found to include stream channelization, runoff associated with livestock production, and crop production with subsurface drainage.

A number of cities and municipalities throughout the Blanchard River Watershed have combined sewer systems (CSSs). These systems carry both storm water and wastewater in a single pipe to a treatment facility. When rainfall or snowmelt is heavy, the flow in a CSS can exceed the treatment plant's capacity. A bypass is activated and combined stormwater and sewer flows are routed around the treatment plant, resulting in CSOs to surface waters. Wastes in CSSs are untreated and, consequently, discharges from CSOs can contain a variety of pollutants such as pathogens, suspended solids, nutrients, toxics and floatable solids. As a result, they can significantly impact streams and rivers after heavy rainfall or rapid snow melts. The Blanchard

River Watershed currently has 36 known CSOs in five communities, ranging from small rural villages to large metropolitan areas (Bluffton-2; Findlay-18; Dunkirk-6; Forest-3; and Pandora-7).

## 5.12 Noise

The Noise Control Act of 1972 (P.L. 92-574) directs Federal agencies to comply with applicable Federal, state, interstate and local noise control regulations. In 1974, USEPA provided information suggesting that continuous and long-term noise levels in excess of day-night sound level 65 A-weighted decibels (dBA) are normally unacceptable for noise-sensitive land uses such as residences, schools, churches, and hospitals. Ohio has no statewide noise regulations; however, Section 505.172 of the Ohio Revised Code (ORC) states that townships may adopt noise control regulations within their unincorporated territory. Table 5.12 identifies those municipalities and townships where various project features are proposed and notes where existing noise ordinances are in place.

| Table 5.12. Study Area Municipalities and Townships, Noise Ordinances | | |
|---|---|---|
| County | Municipality/Township | Noise Ordinance |
| Hancock | City of Findlay | *(a) Every motor vehicle and motorcycle with an internal combustion engine shall at all times be equipped with a muffler which is in good working order and in constant operation to prevent excessive or unusual noise, and no person shall use a muffler cutout, by-pass or similar device upon a motor vehicle on a highway.* (Part Three, Title Five, Chapter 337.20) |
| | Amanda Township | No township noise ordinance has been identified. Town zoning resolution does not address noise from construction activities. |
| | Eagle Township | No township noise ordinance has been identified. Town zoning regulations do not address noise from construction activities. |
| | Jackson Township | *(a) Motor Vehicles.*<br><br>*(1) Operating or permitting the operation of any motor vehicle with a gross vehicle weight rating (GVWR) in excess of seven thousand (7,000) pounds or any auxiliary equipment attached to such vehicle, for a period longer than five (5) minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion, between the hours of 9:00 P.M. and 7:00 A.M. This section shall not apply to public utilities vehicles, municipal service vehicles or buses operated as common carriers.*<br><br>*(2) No person shall operate a motor vehicle on a public right-of-way at any time in such manner that the sound pressure level emitted by said vehicle exceeds the levels set forth in Table 1, below, when measured at the location and distance established by Section 3, also below. This section shall apply to all licensed motor vehicles, whether publicly or privately owned.* (Chapter 558.01) |
| | Liberty Township | No township noise ordinance has been identified. Town zoning resolution does not address noise from construction activities. |
| | Marion Township | No township noise ordinance has been identified. Town zoning resolution does not address noise from construction activities. |

Source: Conway Greene Co. (http://www.conwaygreene.com/index.html)

Ambient noise levels within the study area are influenced by land uses that include industrial, commercial, residential, and agricultural areas. Noise sources include primarily vehicular traffic which includes agricultural equipment and large transport vehicles that travel along county and township roads. Significant noise sources within the study area include Interstate 75 and the Norfolk Southern Railway line.

## 5.13 Cultural Resources

*Indian Nation Interests*

Several Indian Nations were identified that have interest in the general Western Lake Erie Basin area, but none currently have established land interests in the area. Table 5.13 lists federally-recognized Indian Nations with an historic presence and/or prospective interest in the Western Lake Erie Basin. The Wyandotte Nation is the only Indian Nation so far to formally request status as a consulting party. USACE will continue to consult with these Nations concerning their interests as the study progresses and additional information on cultural resources becomes available.

| Table 5.13. Federally Recognized American Indian Nations with Interest in the Western Lake Erie Basin | |
|---|---|
| **Nation** | **Tribal Names** |
| **Miami** | Miami Tribe of Oklahoma |
| **Ottawa** | 1. Little River Band of Ottawa Indians, Michigan<br>2. Little Traverse Bay Bands of Odawa Indians, Michigan<br>3. Ottawa Tribe of Oklahoma |
| **Shawnee** | 1. Absentee-Shawnee Tribe of Indians of Oklahoma<br>2. Eastern Shawnee Tribe of Oklahoma<br>3. Shawnee Tribe, Oklahoma |
| **Wyandotte** | Wyandotte Nation, Oklahoma |

Names reflect the list of Federally recognized tribes as currently listed by the Bureau of Indian Affairs. These names may vary from the official name attributed by each individual government.

*Area of Potential Effects*

As regards cultural resources considerations during a federal undertaking, the Area of Potential Effects (APE) is the geographic area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties (National Register of Historic Places eligible or listed archaeological sites, standing structures, etc.). Depending on the nature of the various project components and the resources that may be affected, the APE may be different for the different kinds of effects caused by the project.

Prior to initiating cultural resources surveys (archaeological and architectural) on any portion of the study, an APE will be designated. The APE should consider the direct area of impact for ground-disturbing activities during construction as well as staging areas for heavy equipment and possible areas for flood storage/wetland and stream mitigation. To ensure that the APE for the direct area of impact fully encompassed all possible areas of proposed construction activity and flood storage/mitigation, use of a 200-foot buffer around proposed alternatives was developed (Chidester et al., 2011). This same methodology will be utilized to set the direct impact APE for cultural resources surveys of the West Diversion, the Blanchard to Lye Cutoff and any associated flood storage/mitigation areas.

The APE should also include areas where the introduction of visual elements might occur. To establish the limits of potential visual impacts simulations were run to determine, under various conditions, how far a flag could be seen (Johnson et al., 2011 and Chidester et al., 2012). Using this methodology buffers were established, unless field conditions indicated otherwise, to use on proposed alternatives in urban commercial settings (1,650 feet), on straight-of-ways in older residential neighborhoods (1,950 feet), off straight-of-ways in older residential neighborhoods (425 feet), in residential areas along the river (690 feet) and in agricultural settings with large expanses of flat land (1,500 feet) (ibid.). The West Diversion, the Blanchard to Lye Cutoff and currently proposed mitigation areas primarily occur in agricultural and older residential neighborhood settings and so will utilize these buffers, as appropriate, in setting the visual impact APE (Figure 5.13). Additional information on the APE for the currently considered corridors can be found in Environmental Appendix .

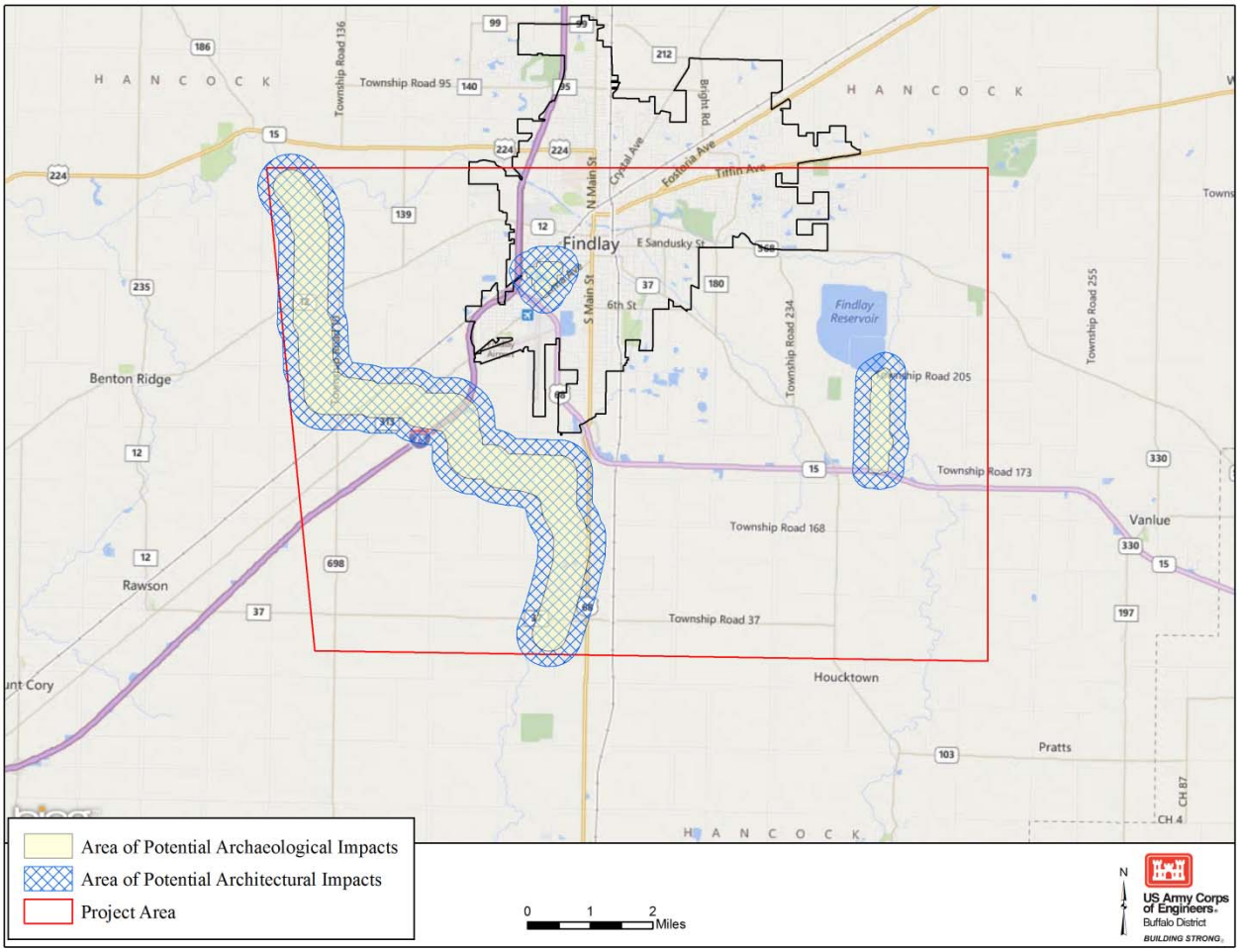


**Figure 5.13. Archaeological and Architectural APE within the Project Area.**

*Cultural Resources Setting*

At the start of the study process within the Blanchard River Watershed, few cultural resources investigations covering large areas had been completed within Hancock County, Ohio. The cultural resources investigation that will be undertaken for the study will help to provide a more complete regional cultural resources perspective for the Blanchard River Watershed located within Hancock County. This study will also help to better define the survey methodology and type, number and quality of cultural resources likely to be encountered in other portions of the study area APE yet to be examined. The information gathered as a result of this investigation is presented here as the cultural resources setting for the present study.

The prehistoric occupation of Ohio is generally divided into four broad periods: Paleo-Indian, Archaic, Woodland, and Mississippian. The Paleo-Indian Period (ca. 12,000 – 9,600 B.P.) encompasses the cultural remains of the earliest recorded occupations of the region during early postglacial times. The Archaic (9,600 – 2,500 B.P) is identified by archaeologists as the period when more localized seasonal settlement and subsistence patterns replaced the broad seasonal migration patterns of the Paleo-Indian Period. The Archaic Period is usually

subdivided into the Early Archaic (9,600 – 8,000 B.P.), Middle Archaic (8,000 – 5,000 B.P.), and Late Archaic (5,000 – 2,500 B.P.) periods. Broad exchange patterns, the innovation of ceramic technology, the emergence of cultigens, and an increasing shift toward sedentism generally identify the transition to the Woodland time period (2,500 – 500 B.P), which is also subdivided into Early (2,500 – 1,900 B.P.), Middle (1,900 – 1,400 B.P), and Late Woodland (1,400 – 500 B.P.) periods. The Late Prehistoric Period (A.D. 900 – A.D. 1650) is marked by continued population growth, large villages, and subsurface storage pits resulting from an increased reliance on maize agriculture (Chidester et al., 2009).

European explorers began having an influence on the Native American populations of northern Ohio as early as the mid-1500s through the disbursement of European trade goods. The trade goods were finding their way into the area from the region north of Lake Erie. But their presence and activities in the area discouraged other settlers, Native American and European, until the late 1600s. Then other Native American nations such as the Shawnee, Delaware, Wyandot, Miami and Ottawa moved into the area followed shortly after by European explorers (Chidester et al., 2009).

Large-scale European settlement of Hancock County did not begin in earnest until after the War of 1812, with the first documented settlement occurring in 1815. Settlements during the 1820s and 1830s were established along rivers and ridges, including the village of Findlay. The County was surveyed in 1820. Findlay was laid out in 1821 (though its survey was not officially recorded until 1829), designated as the county seat in 1824, incorporated in 1838 and reincorporated in 1845. Settlement during this time was slow, due in part to the county's location on the southern boundary of the Great Black Swamp, once a poorly drained area. This changed in the late 1800s when a public works program had over 1,000 miles of ditches excavated to drain the swamp. This led to the expansion of rich farmland areas (Chidester et al., 2009).

Background cultural resources records searches undertaken for the study area in Hancock County included an examination of the Ohio Archaeological Inventory (OAI), the Ohio Historic Inventory (OHI), the National Register of Historic Places (NRHP) files as well as a review of cultural resource reports for some limited investigations that were able to be conducted within the area. The records check revealed that seven previous cultural resources surveys had been conducted within the Hancock County area. Based on these surveys and the inventory/NRHP files, a number of archaeological sites and standing structures were previously recorded in the study area. These include 15 archaeological sites and 177 standing structures/districts in the Hancock County area (Chidester et al., 2009 and 2011).

In addition to the background records check, Phase I archaeological and architectural surveys of areas included within the study were also undertaken. Some of the areas examined, while no longer within the study APE due to the elimination from consideration of preliminary alternative plans, do still provide valuable information on the prehistory and history of the overall study

area.

The Phase I archaeological reconnaissance undertaken for the study in Hancock County resulted in the identification of 63 archaeological sites/isolated finds. Of the total sites, two prehistoric, 43 were historic-period, and 18 contained both prehistoric and historic components. Forty-eight of the archaeological sites documented during the survey did not yield sufficient data or intact features to indicate that they contain significant data and therefore are not eligible for the NRHP. The remaining 20 sites did yield sufficient data or intact cultural features to indicate that they have the potential to contribute important information to the study of significant local and/or regional historic contexts (Chidester et al., 2011).

Site types include intensive prehistoric tool production and/or maintenance locales and possible base camps, historic farmsteads, historic industrial sites, historic urban domestic sites, historic institutional sites, a historic municipal site, and a historic site that was potentially produced by a singular, short-term event such as a large feast or other communal gathering (Chidester et al., 2011).

In addition to standard methods commonly used during Phase I reconnaissance surveys, nine urban neighborhoods in Hancock County were investigated through archival research and the compilation of land-use histories for representative properties within each neighborhood. Based on the results of this research, six neighborhoods were identified as being potentially sensitive for historic-period archaeological resources. These six neighborhoods may require additional archaeological investigation if they cannot be avoided by the project (Chidester et al., 2011).

The Phase I architectural survey undertaken for Hancock County identified 324 properties (representing 379 individual buildings or structures) over 50 years of age that retain some elements of physical integrity. Of the 324 properties identified and recorded in this survey, 94 were deemed to have retained their material integrity and represent a high degree of architectural interest, known historical/cultural associations, or are best examples of vernacular or repetitive property types. While 62 of the properties are already listed on the OHI, 32 properties were previously unrecorded. Fifty-five of the previously recorded OHI sites are located in the Findlay Downtown Historic District. Additional Phase II study was recommended for 54 properties. These were properties that maintain their physical integrity, are architecturally notable, are best examples of a property type, or that suggest a potential for historic significance that was not revealed at the reconnaissance level of research (Johnson et al., 2011).

None of the architectural properties identified are located within the study APE as currently described.

Areas within the project boundaries that have not been subjected to a cultural resources investigation will be delineated in a Programmatic Agreement (PA) that is being negotiated with the Ohio State Historic Preservation Office (Ohio SHPO) and other consulting parties. The PA will outline how these areas will be investigated, evaluated and, if necessary, mitigated. A

preliminary draft of the PA is in the process of being drafted at this time.

## 5.14 Utilities and Infrastructure

Data concerning utilities and infrastructure include pipelines, oil and gas wells, aqueducts, water wells and fiber optic lines. There are seven pipelines, with several aligned adjacent to each other, which have been digitized using US Geologic Survey (USGS) topographic maps (Figure 5.14a). There are approximately 7,500 oil and gas wells within Hancock County that are mapped by the Ohio Department of Natural Resources (Figure 5.14b). However, most of these wells were under operation during the oil and gas boom of the late 1800s and are currently abandoned. There is one aqueduct located in the project area outlined by the Hancock County Engineer's Office (Figure 5.14c). According to the ODNR's Water Well log, there are approximately 6,500 water wells within Hancock County (Figure 5.14d). Based on available information, approximately six underground fiber optic lines are located along Township Roads 50, 67 and 76 and County Roads 9 and 313.

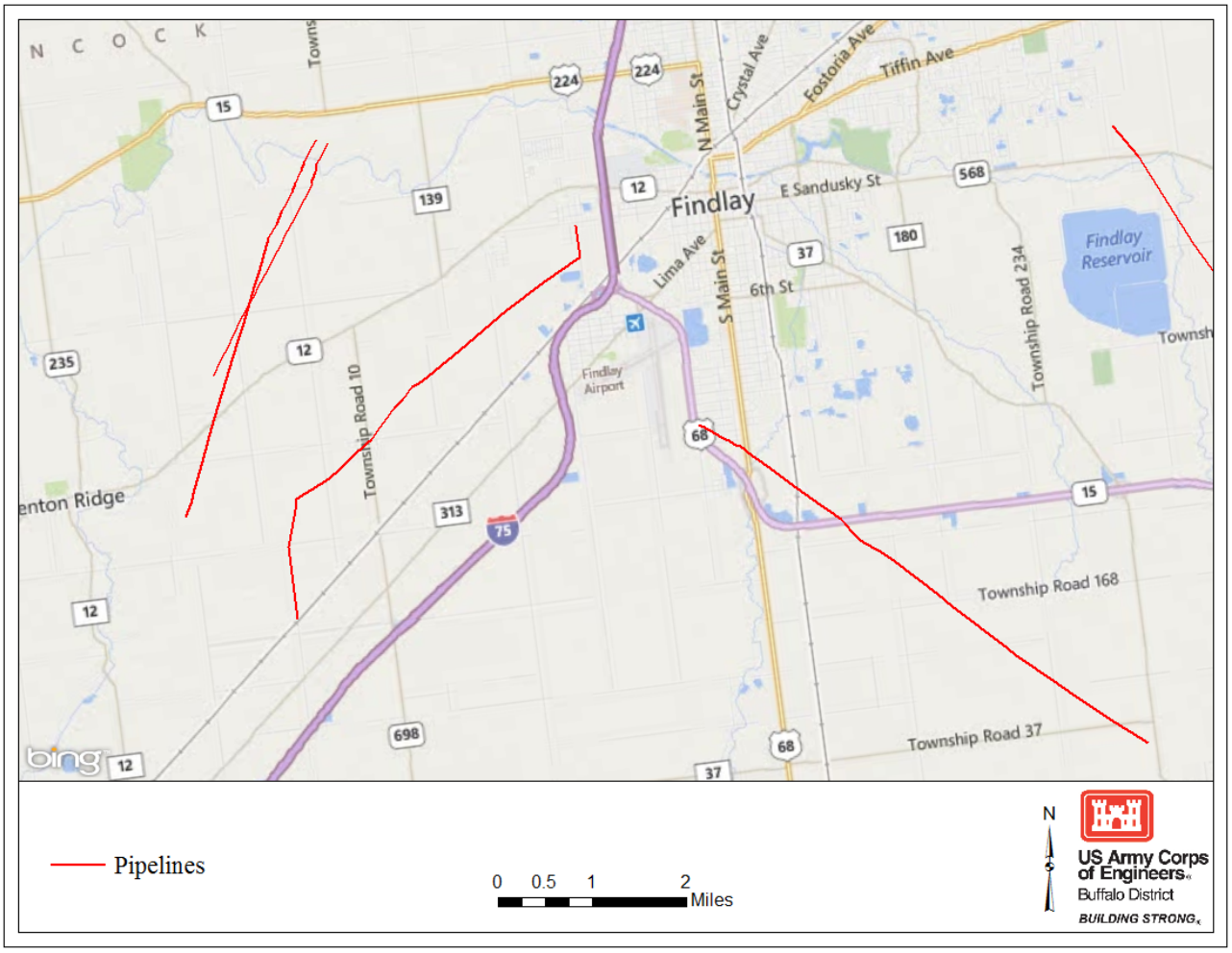


**Figure 5.14a. Pipelines in the Vicinity of the Proposed Measures (USGS)**

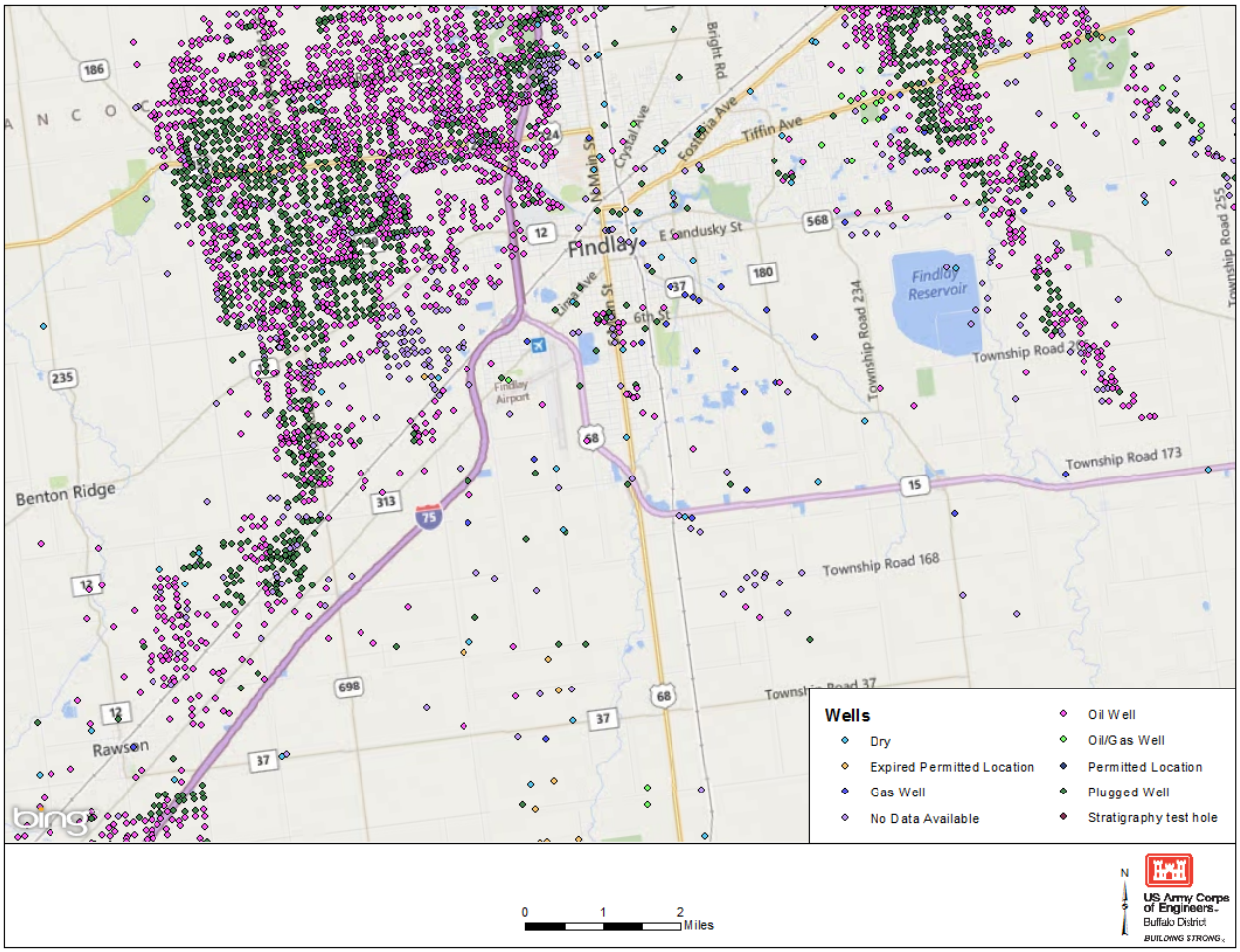


**Figure 5.14b. Oil and Gas Wells in the Vicinity of the Proposed Measures (ODNR)**

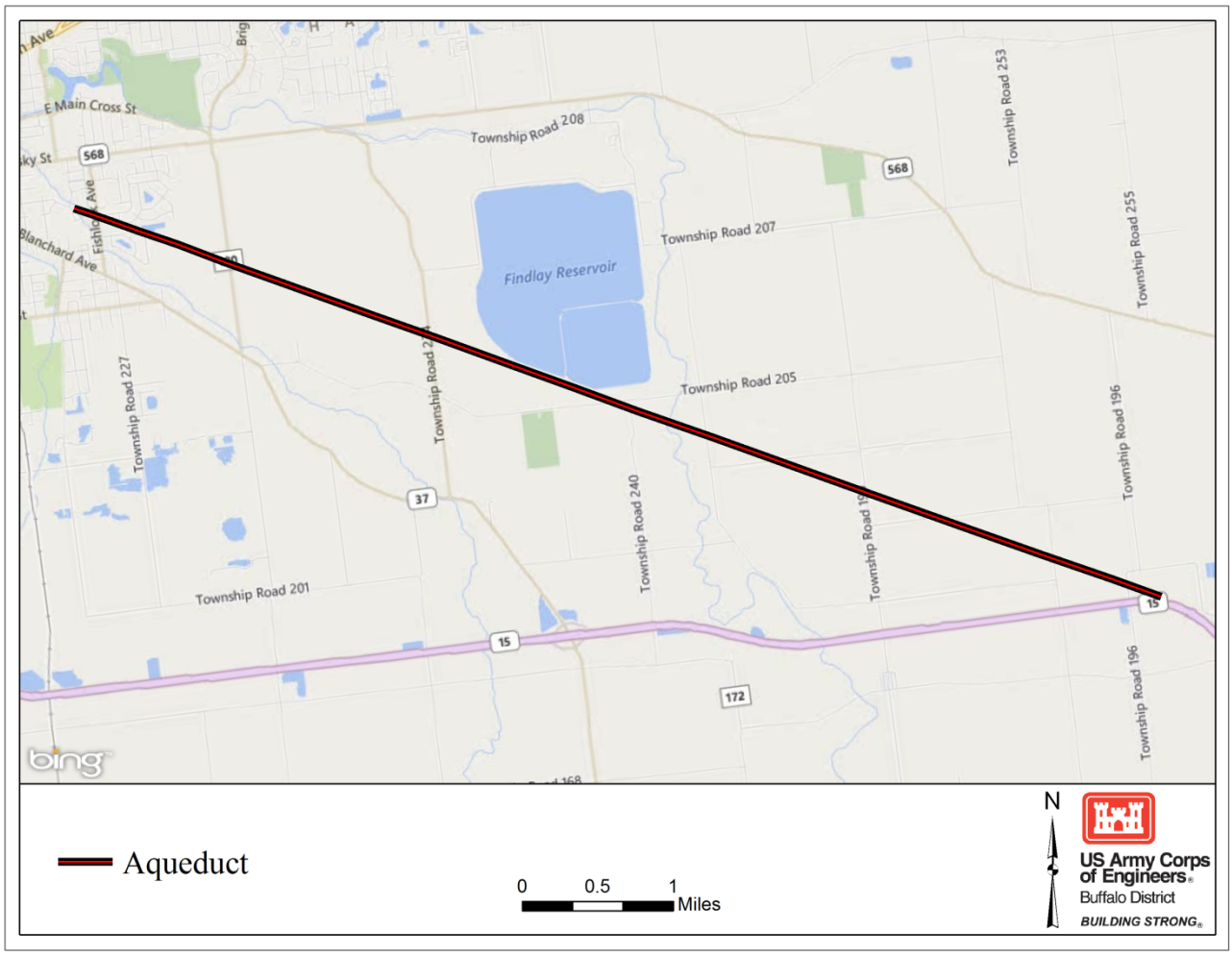


**Figure 5.14c. Aqueduct location in the Vicinity of the Proposed Measures (USGS)**

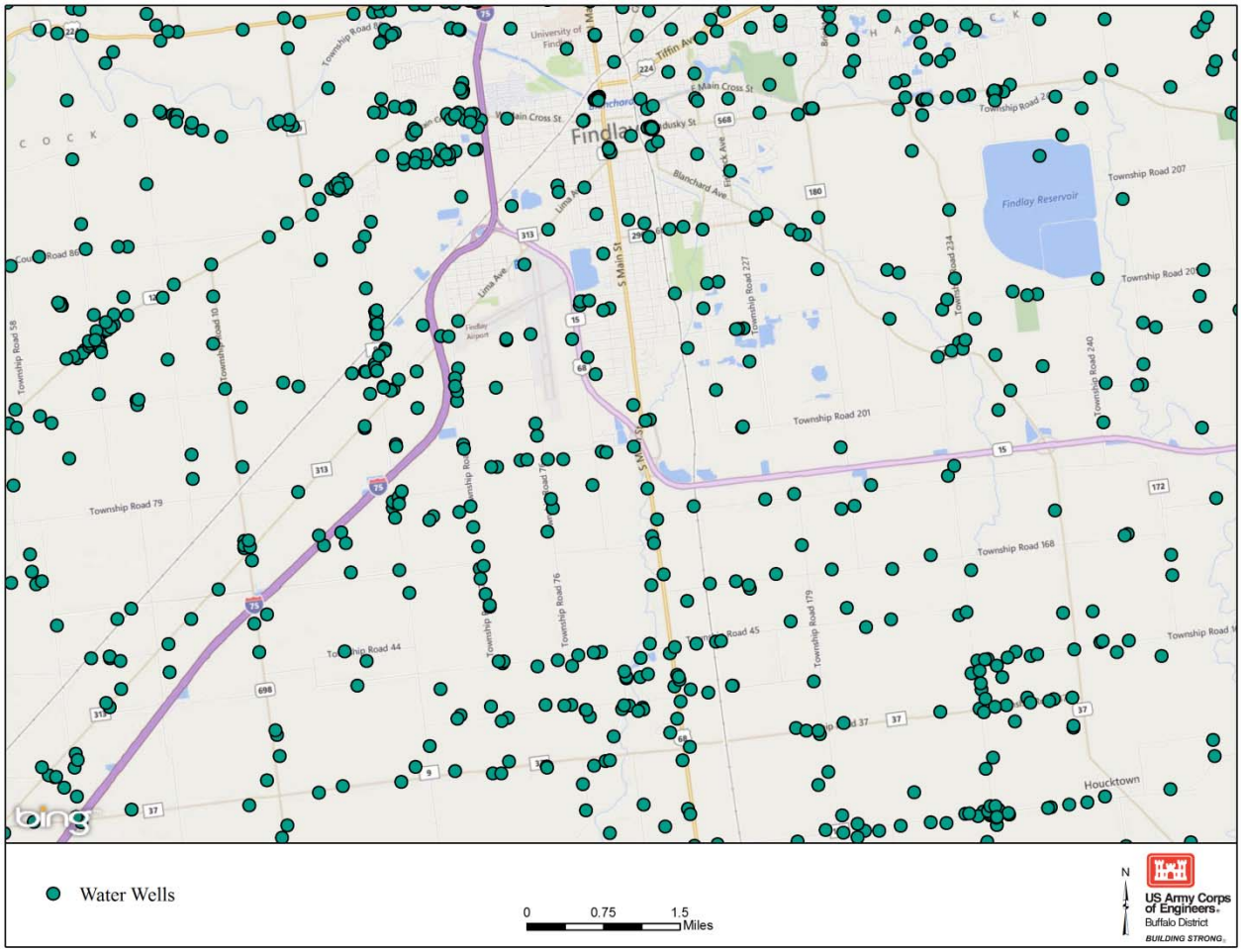


**Figure 5.14d. Water Wells in the Vicinity of the Proposed Measures (ODNR)**

## 5.15 Transportation

Major transportation routes within the Blanchard River Watershed include Interstate 75 (I-75), US 68, US 224, US 30, and State Route 15 (Figure 5.15). This road system offers convenient links with several key cities including Cleveland, Cincinnati, Columbus, and Lima, Ohio, Detroit, Michigan and Fort Wayne, Indiana. Within the Blanchard River Watershed there are approximately 2,300 linear miles of roads, with 250 linear miles of roads occurring within the Findlay city limits.

The region's accessibility has significantly contributed to its economic growth. While Hancock County is largely rural, it is also home to many businesses including Cooper Tire, Consolidated Biscuit, the Harris Corporation, Marathon Petroleum and Whirlpool Corporation who are able to quickly and easily export manufactured goods using the region's many convenient state routes and interstates. The region also bolsters a significant agricultural economy. Hancock County currently has 281,190 acres of farmland in production, which according to the Ohio Department of Agriculture is presently ranked sixth of 88 counties in the state (ODA, 2014). This economy of the region has benefited greatly from the infrastructure of roadways, rail lines, and airports.

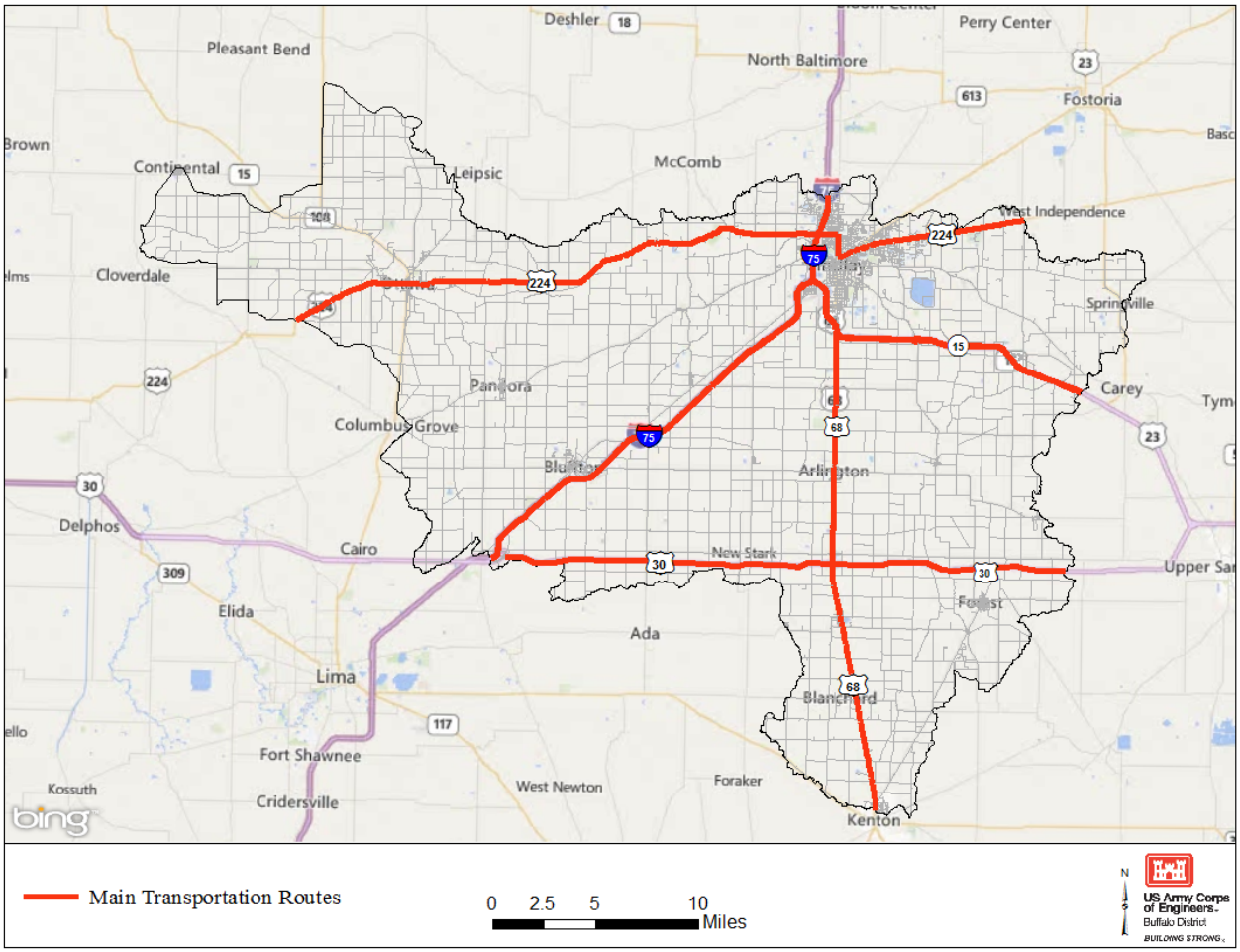


**Figure 5.15. Major Roadways within the Blanchard River Watershed**

*Roadways*

Interstate 75 is the major roadway passing through the Blanchard River Watershed study area. It extends in a northeasterly direction from Beaverdam to Findlay, and then northward from Findlay to the watershed boundary. This major interstate serves not only local transportation needs but also is a significant route for movement of goods manufactured in Findlay to other parts of the country, as far as north the Canadian border and as far south as Florida. Interstate-75 provides major access to the north and southwest, while Route 224 provides major east-west access and U.S. Route 68 is a key local access route to the south. State Route 15 also is a major limited access connector with points southeast of Findlay to the Columbus metropolitan area and beyond.

*Rail*

Rail access is also critical to the local and regional economy. A network of key freight lines allow for easy movement of the study area's manufactured goods and agricultural products (most notably corn and soybeans). Rail lines in the study area are operated by CSX Transportation, Inc. (CSX *Toledo Subdivision*, *Toledo Branch Subdivision*, *Columbus Subdivision*), and Norfolk

Southern Corporation (*Fostoria District, Lima District).* There are eight rail lines that cover approximately 170 miles. These lines include: the Penn Central, The Norfolk Western, the Detroit Toledo and Ironton, Conrail, Chesapeake and Ohio, Baltimore and Ohio, and the Akron Canton and Youngstown Railroad.

*Air Service*

The Findlay airport is a general aviation airport operated by the City of Findlay. The major facilities at the airport include a 6,500 foot primary runway (18-36) with a full parallel taxiway and a 5,883 foot long crosswind runway (7/25) (city of Findlay, 2014). Other facilities present at the airport include the city of Findlay as a fixed base operator, aircraft storage areas, and fuel services.

Weaver Airport is a privately owned airport operated by a private citizen located four miles north east of Findlay. There are no other buildings present along the turf runway that is 2,300 feet long by 70 feet wide. From the official records there are four aircraft based on the airfield, consisting of two single engine planes, and two ultralights (AirNav.com, 2014).

Ferrell Airport is a privately owned airport operated by a private citizen four miles southeast of Findlay, Ohio. The turf runway is 2,300 feet long by 79 feet wide. From official records there is one single engine plane based at the field (AirNav.com, 2014).

Lutz Airport is a privately owned and operated airport four miles southeast of Findlay, Ohio. The turf runway is 2,200 feet long by 75 feet wide with a 650 foot tower obstruction 5,700 from the runway. Three single engine airplanes are housed at the field (AirNav.com, 2014).

Schaller Airport is a privately owned and operated airport five miles southwest of Findlay, Ohio. The turf runway is 2,580 feet long by 70 feet wide. A single engine airplane housed at the field (AirNav.com, 2014).

*Bus Services*

A single bus terminal exists within the Blanchard River Watershed. The Greyhound terminal is located in Findlay and has lines that run north to Toledo, south to Columbus, northeast to Cleveland, and west to Indianapolis, Indiana. Other bus services include the Hancock Area Transportation Services, which is open to the general public and charges a small rider's fee.

## 5.16 Aesthetics and Visual Resources

The aesthetics and visual resources present in the Blanchard River Watershed vary greatly depending on location. The watershed ranges from high intensity urban development to agricultural areas. The landscape within Hancock County generally consists of flat agricultural areas that were originally part of the Great Black Swamp, which was drained for human use. Some of the water resources present within the area possess a narrow riparian buffer, but the vast majority of the land is cropland with little to no tree cover. While most of the non-urbanized

areas within the Blanchard River Watershed are agricultural, some scattered wooded parcels still persist in the area.

The 26 mile stretch of the Blanchard River that flows between Findlay and the village of Ottawa is listed on the Nationwide River Inventory (NRI). This segment of the Blanchard River is listed on the NRI due to remnant forested patches present within a gently rolling agricultural landscape, the little development in the area and the presence of many 19th century buildings that are being restored (NPS, 2015a).

## 5.17 Recreation

Outdoor recreation within the Blanchard River Watershed includes activities such as boating, hunting, fishing, hiking, and passive outdoor activities. There are 22 parks or recreation areas within the project area (Table 5.17; Figures 5.17a and 5.17b).

Table 5.17. Park and Recreation Areas in Findlay, Ohio

| Park/Recreation Area | Address |
|---|---|
| Anchor Park | Central Parkway, Findlay, Ohio |
| Bernard Park | Bernard Ave., Findlay, Ohio 45840 |
| Blue Rock Nature Preserve | E Edgar Ave., Findlay, Ohio 45840 |
| Civitan Park | Central Pkwy., Findlay, Ohio 45840 |
| Donnell Park | Stadium Dr., Findlay, Ohio 45840 |
| Douglas Park | Douglas Pkwy., Findlay, Ohio 45840 |
| Eagle Creek Park | 526 Hancock St., Findlay, Ohio 45840 |
| Ede Park | Terrance Ln., Findlay, Ohio 45840 |
| Emory Adams Park | S Blanchard St., Findlay, Ohio 45840 |
| Firestine Park | Brookhaven Rd., Findlay, Ohio 45840 |
| Hancock Park District Headquarters | 1424 East Main Cross St., Findlay, Ohio 45840 |
| Hancock County War Memorial | 300-308 N. Main St., Findlay, Ohio 45840 |
| Koehler Field | First St., Findlay, Ohio 45840 |
| K-9 Field of Dreams Dog Park | Marion Township 208, Findlay, Ohio 45840 |
| Litzenberg Memorial Woods | 6100 U.S. Route 224, Findlay, Ohio 45840 |
| Mound Park | Mound St., Findlay, Ohio 45840 |
| Oakwoods Nature Preserve | 1400 Oakwoods Ln., Findlay, Ohio 45840 |
| Rawson Park | 720 River St., Findlay, Ohio 45840 |
| Riverbend Park | Marion Township 208, Findlay, Ohio 45840 |
| Riverside Park | 231 McManness Ave., Findlay, Ohio 45840 |
| Swale Park | N. West St., Findlay, Ohio 45840 |
| West Park | Byal Ave., Findlay, Ohio 45840 |

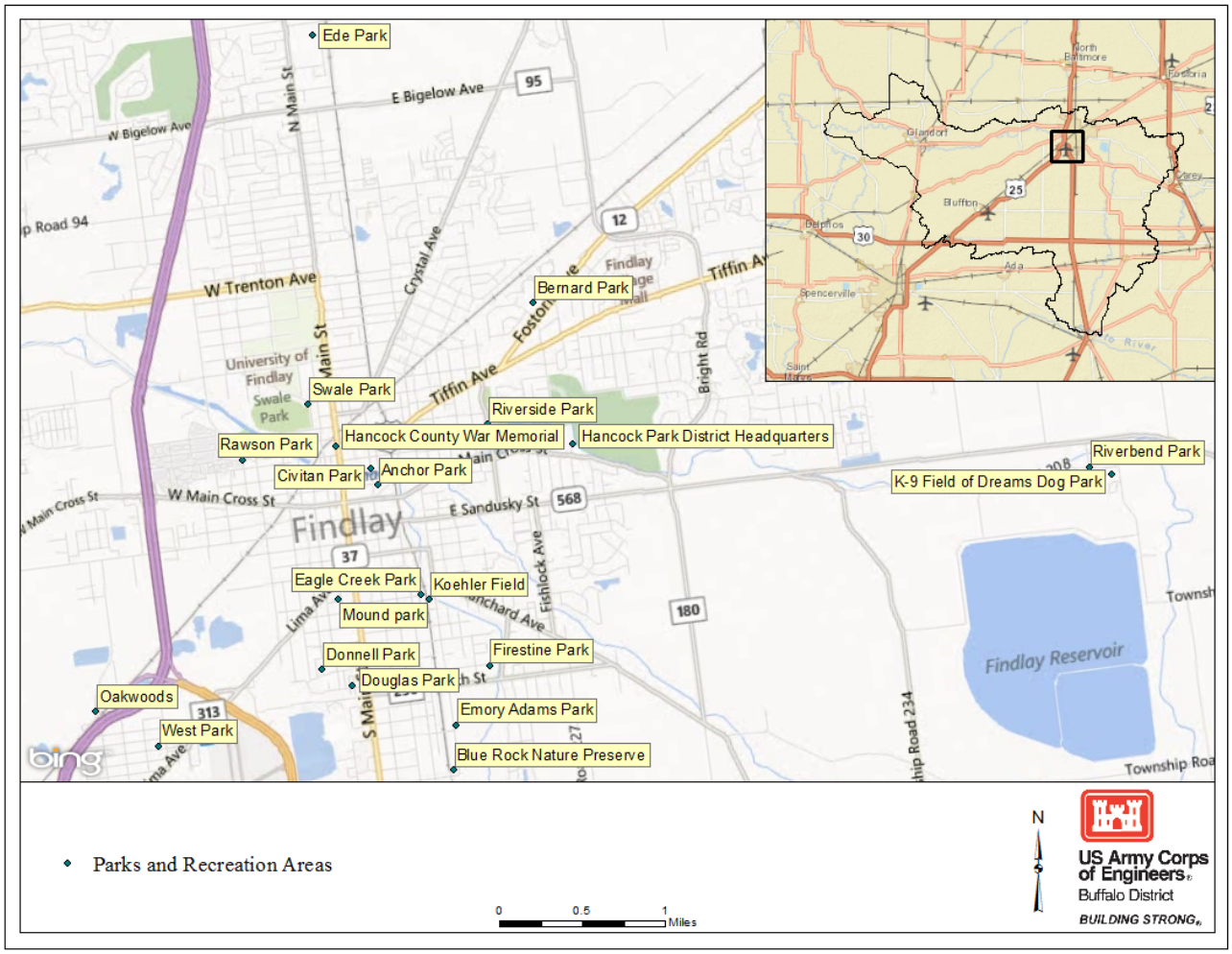


**Figure 5.17a. Park and Recreation Areas in the city of Findlay, Ohio**

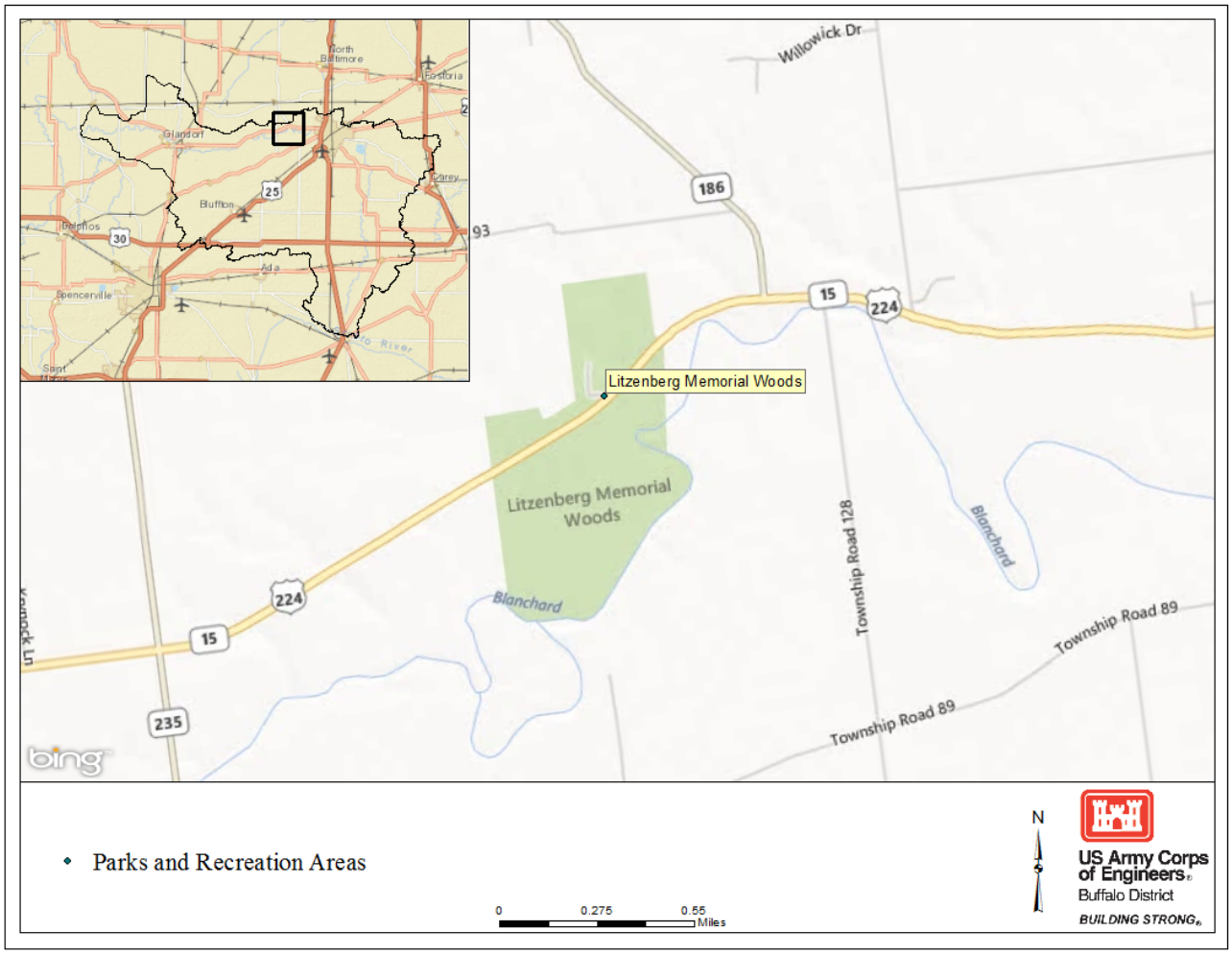


**Figure 5.17b. Litzenberg Memorial Woods, in the vicinity of Findlay, Ohio**

Local parks and recreation areas offer opportunities for passive outdoor recreation and serve as venues for sports, festivals, family activities and various seasonal events, and many of these are notably tied directly to water features such as the Blanchard River. Townships maintain some natural areas for fishing and hunting.

Recreational boating activity is largely limited to small, non-motorized boats. Limited power boating opportunities exist on local reservoirs, with Hancock County Park on Findlay Reservoir operating the watershed's only marina. There are 18 boating access points along the Blanchard River. Boating opportunities on local waterways are often limited or dangerous due to existing low-head dams, log jams, and shallow water depths. Existing county programs provide for log jam removal to facilitate boating and to ensure a free flowing condition on local streams and ditches. Reservoirs and watercourses provide recreational fishing opportunities. Hunting is limited to fence rows and woodlots, and along streams and ditches where only minimal habitat exists.

## 5.18 Hazardous Substances/Petroleum Products

Phase I Environmental Site Assessments (ESAs) were conducted in 2010 and 2013 on properties in the project area (American Structurepoint, 2011a-d; 2014a-c). The ESAs were conducted in accordance with the following American Society for Testing and Materials (ASTM) standard practices:

- E 1527-05 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*
- E 2247-08 *Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property*

The Phase I ESAs focused on areas of project features that were established after flood mitigation alternatives were screened. A total of 197 properties were assessed from the following areas where measures are proposed (Figure 5.18):

- Blanchard-Lye Cutoff Levee
- Alignment 2 Alternative

Summaries of the ESA reports are provided in Appendix 7. Recognized environmental conditions (RECs) were identified in rural areas southwest of Findlay and in Findlay. This included an abandoned tank farm containing approximately 10 to 15 discarded drums, and an excavated tank with piping. The RECs in the city of Findlay were attributed to prior activities associated with coal storage, dumping, machine shop operations, dry cleaning, bulk oil storage, and chrome plating. Some sites adjacent to the investigated properties have documented contamination, leaking underground storage tanks, institutional controls, or have undergone corrective actions.

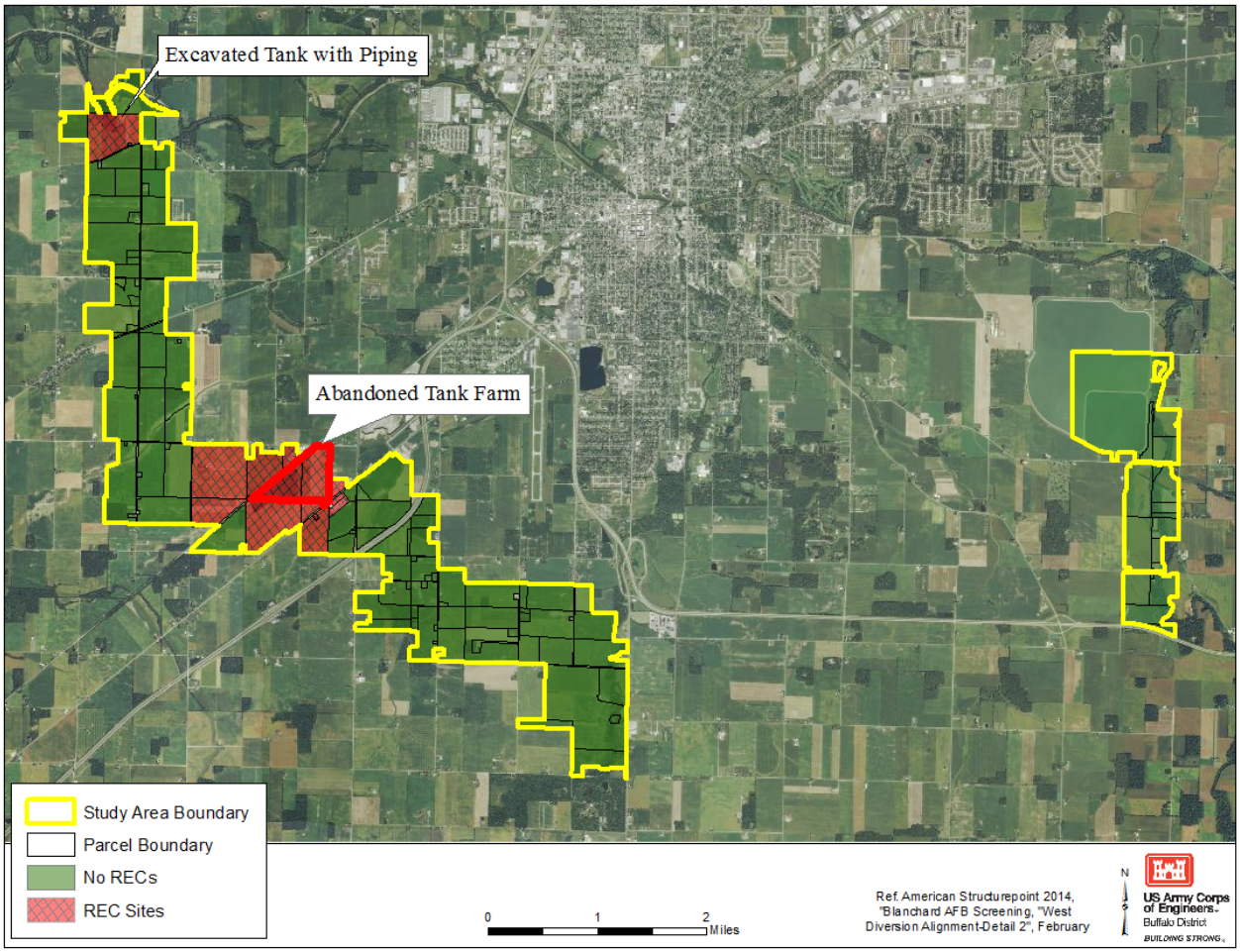


**Figure 5.18. Phase I Environmental Site Assessment parcels within the project area (American Structurepoint)**

## 5.19 Socioeconomics

Five-year average (2008-2012) American Community Survey (ACS) data was queried to obtain relevant socioeconomic data for this analysis. The ACS data is tabulated by the U.S. Census Bureau and was procured at the national, state, county and local levels (USCB, 2014a). For further data and information, refer to the Economics Appendix.

*Population size and composition:*

According to the ACS Demographics and Housing Estimates from 2008-2012, the Findlay, Ohio area has a total population of 41,301. Of this total population the male and female percentages are 46.8 percent and 53.2 percent, respectively. The median age within Findlay is 36.2 years of age. Nationally, the male and female populations are almost a 1:1 ratio of 49.2 percent and 50.80 percent. The median age in the United States is estimated to be 37.2. Persons under age 18 comprise 21.9 percent of the total population of Findlay, compared to 23.9 percent nationally. The percentage of residents over the age of 65 (14.5 percent) is higher than the national percentage of 13.2. Figure 5.19a below depicts the population densities of the city of Findlay.

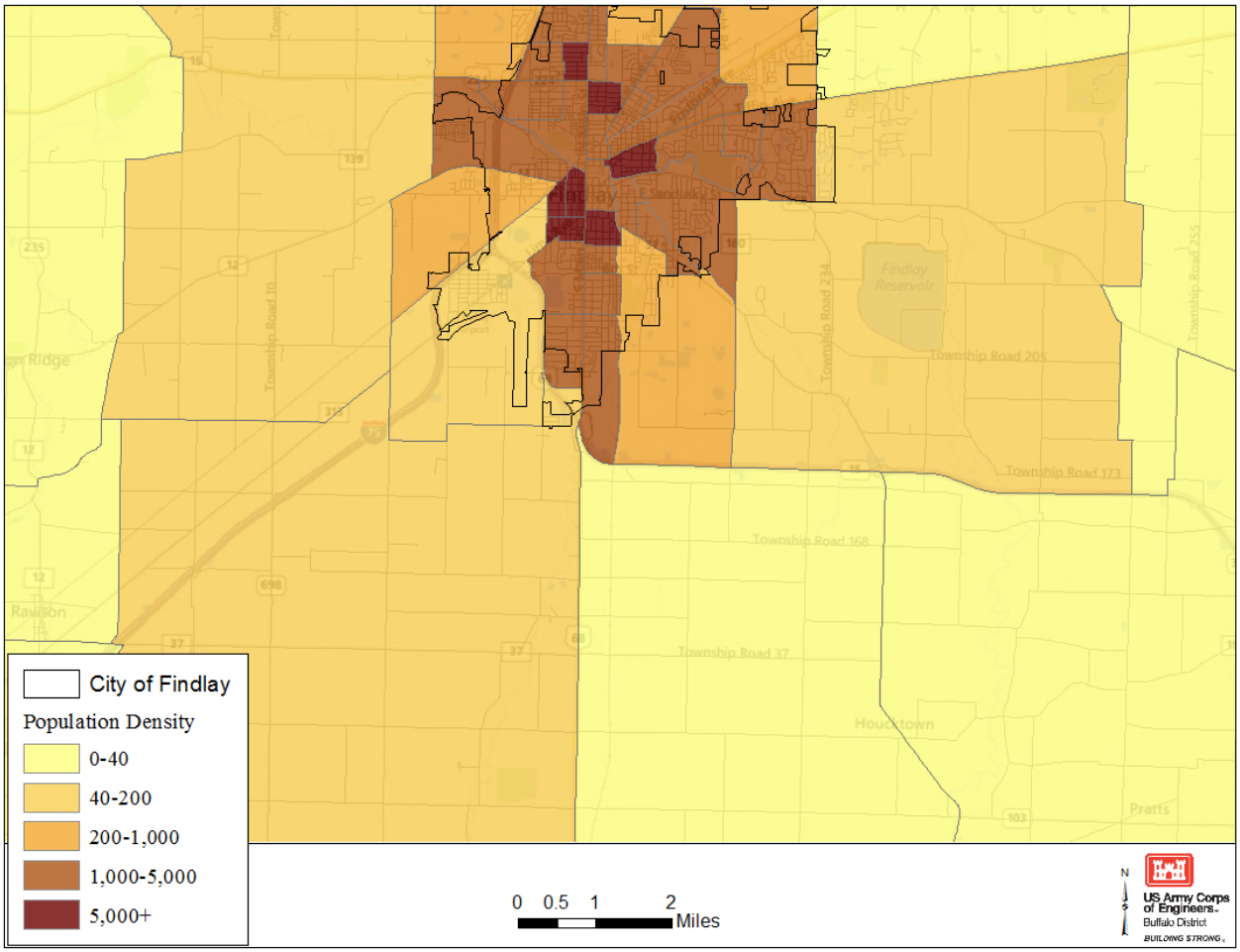


**Figure 5.19a. Population Densities within the city of Findlay (ACS, 2008-2012)**

Estimates for population from the Census Bureau's QuickFacts from 2010-2013 show the city of Findlay, as well as both Hancock County and the state of Ohio, are increasing in population. Hancock County had an increase of 1.3 percent of the population while the State of Ohio had a 0.3 percent increase. The city of Findlay fell between the county and state with a 0.8 percent increase. The city of Findlay represents 55 percent of Hancock County's total population.

*Housing and Household Structure:*

The ACS five year estimates from 2008-2012 indicate that there are 19,198 households within Findlay. Of this number approximately 9.5 percent are vacant. This vacancy rate is slightly higher than the county average, but lower than the state and national averages. Of the 17,373 occupied units, 67.5 percent are single-unit (attached or detached), 25.9 percent are multi-unit structures, and 6.5 percent are mobile homes. These households are 60.1 percent owner-occupied and 39.9 percent renter-occupied. The average household sizes of these owner-occupied and renter-occupied households are 2.39 and 2.12 people, respectively.

The median home value within Findlay is $122,900, which is lower than the county ($129,800), state ($133,700), and national median value ($181,400). Based on the 2008-2012 ACS five year estimates, the median monthly housing cost for mortgaged owners was $1,161, which is lower compared to county ($1,303), state ($1,204), and national averages ($1,559). Of the households with a mortgage, a quarter pay more than 30 percent of their household income toward the mortgage (36.8 percent nationally).

Gross rent charged for housing is approximately $651, which is lower than the county ($658), state ($710), and national ($889) averages. Nearly half of the households who are renters pay more than 30 percent of their household income on housing, compared to 52.1 percent nationally.

*Race/Ethnic Diversity:*

While ethnic diversity in Findlay is much lower than the state and national levels, there seems to be an upward trend in the ratio of minority residents to white residents. Between the 2000 census and the 2008-2012 ACS five year estimates, Findlay indicates an increase in the percentage of minority persons as a whole for the total population of 41,301 people. The largest three races by proportion are White (91.3%), Black or African American (2.7%), and Asian, (2.6%).

*Education:*

Of those residents within the city of Findlay over 25 years of age, 89.8 percent have a high school degree or greater and 23.3 percent of the population have a bachelor's degree or greater. This is compared, respectively, to 85.7 percent and 28.5 percent nationally. Figures 5.19b, 5.19c, and 5.19d below depict education levels per block group by percentage of the population with less than a $12^{th}$ grade education, those populations with a high school diploma, and those populations with a college degree.

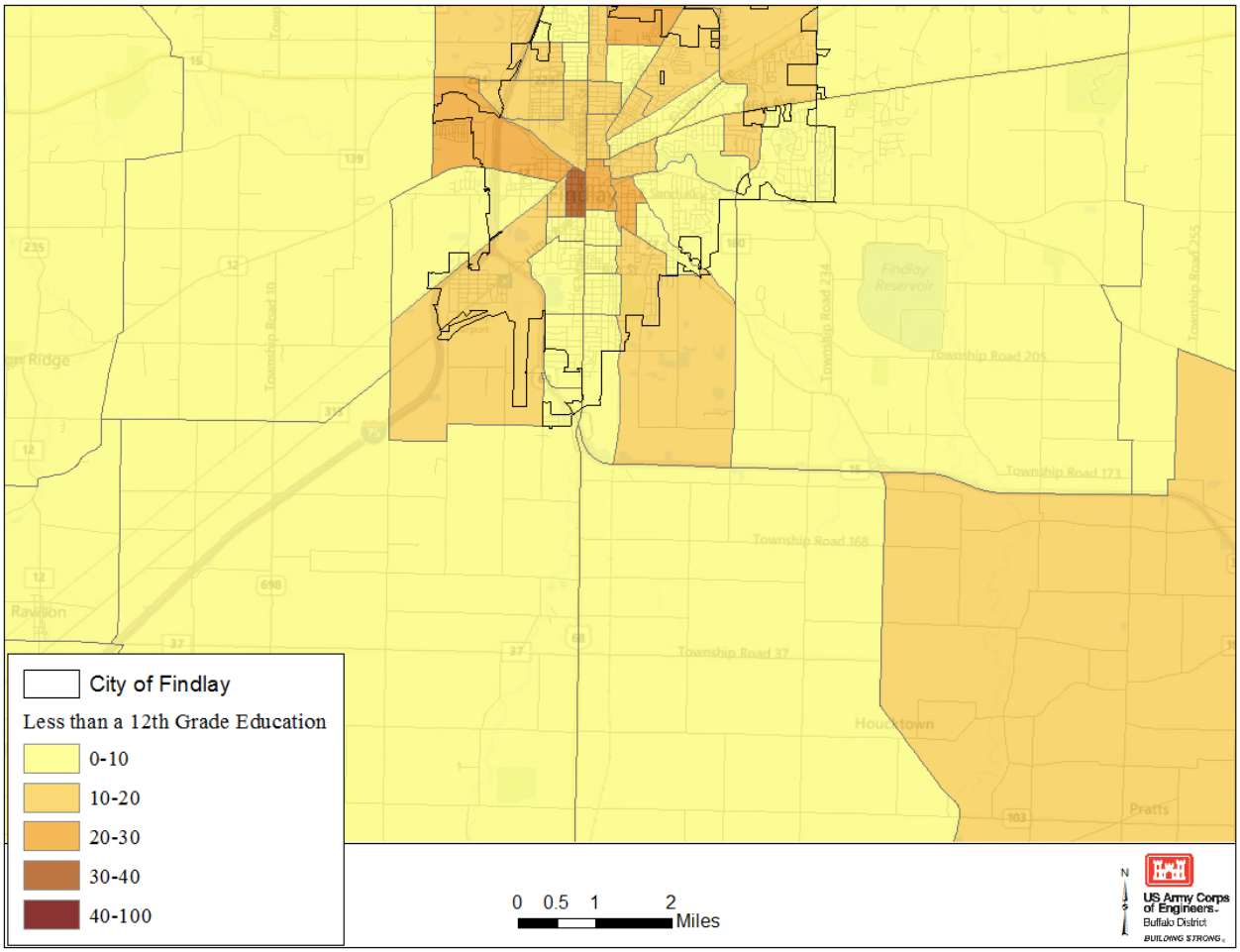


**Figure 5.19b. Block group distribution of populations with less than a 12th grade education (ACS, 2008-2012)**

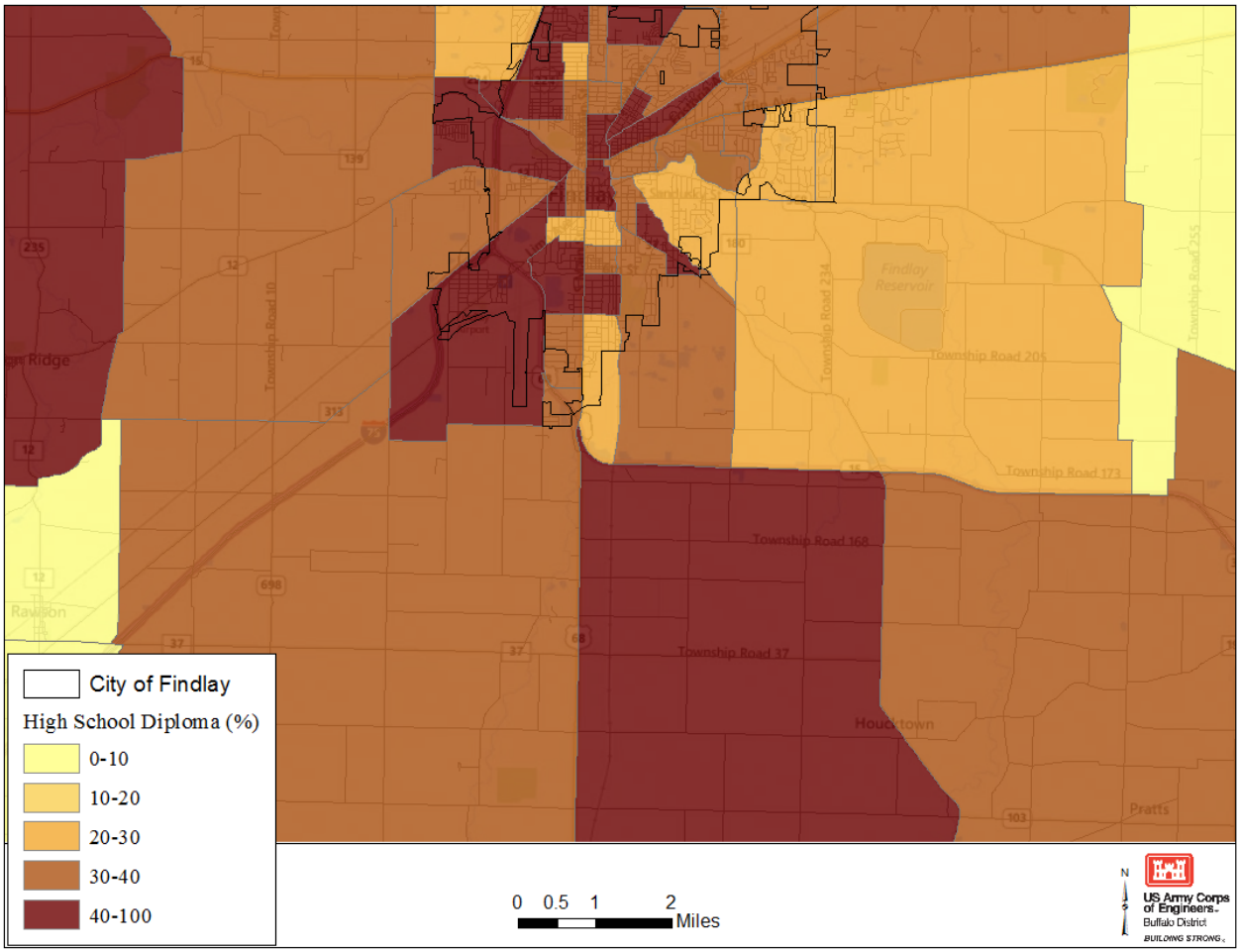


**Figure 5.19c. Block group distribution of populations with a high school diploma (ACS, 2008-2012)**

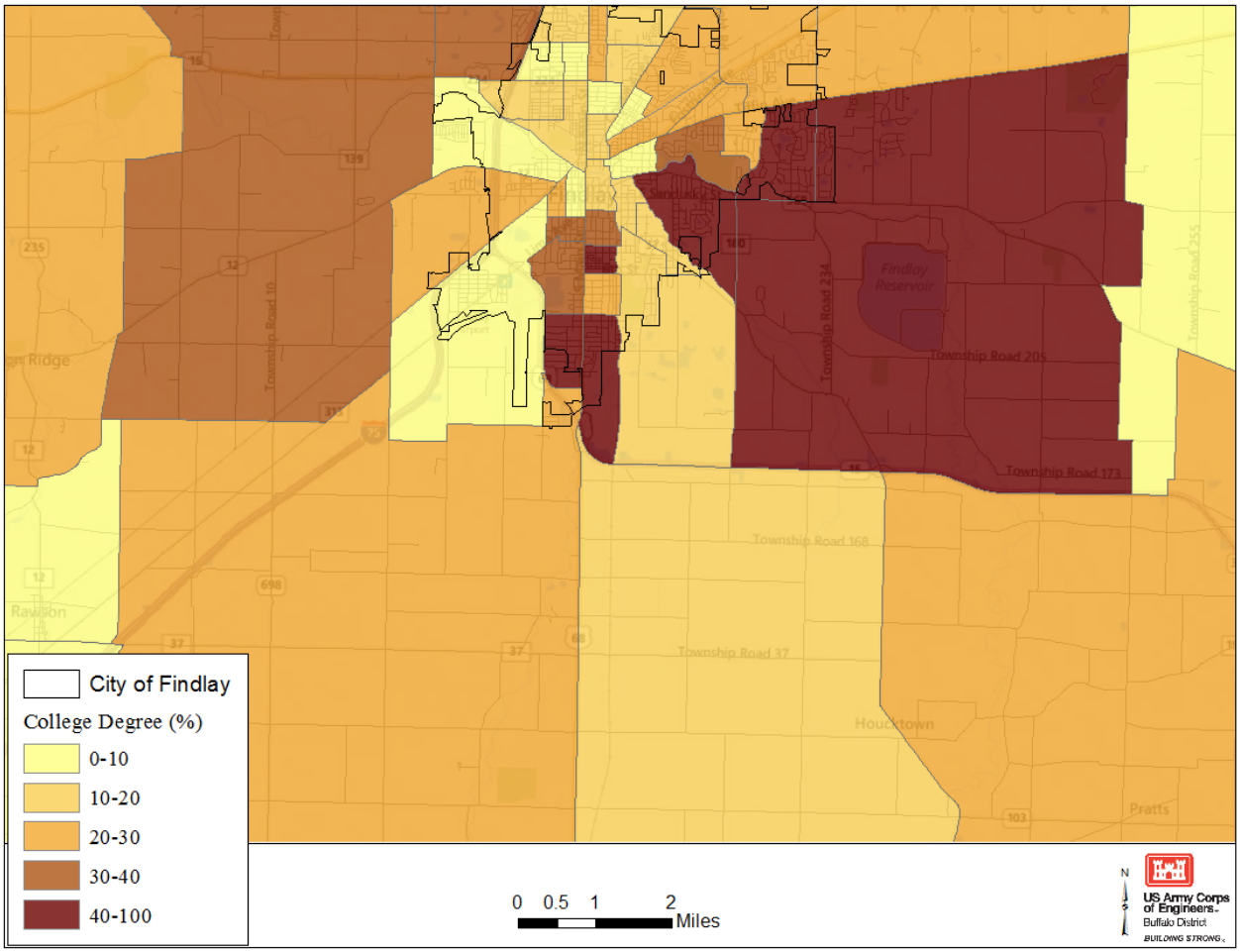


**Figure 5.19d. Block group distribution of populations with a college degree (ACS, 2008-2012)**

*Income:*

Median earnings within Findlay are lower for both residents who have a high school diploma and those who have a bachelor's degree compared to the national average. Nationally, people with a high school diploma make $33,048 while people with bachelor's degrees make $50,096, compared to $28,848 and $40,667 in the city of Findlay, respectively. Table 5.19d presents the breakdown of ages to education levels at four geographic scales: the city of Findlay, Hancock County, Ohio, and the United States. The median household income for the city of Findlay ($43,101) is lower than the county, state, and federal median incomes of $49,350, $48,246, and $53,046, respectively. In addition, the median family income is also lower than the other three geographical study areas, and per capita income is four percent lower than both Hancock County and the state of Ohio and 11 percent lower than the per capita income of the United States.

*Employment:*

The 2008-2012 ACS data show that the civilian labor force (16-years and over) within Findlay is 19,751. The unemployment rate is 10.2 percent, which is slightly higher than the county, state,

and national averages. The largest occupation group is the management, business, science and art occupation which employs 33.4 percent of the civilian labor force. The largest industry is manufacturing, which employs 24.9 percent of the civilian labor force. Table 5.19g summarizes the median incomes by occupation of the four geographic levels of interest: the city of Findlay, Hancock County, Ohio, and the United States.

*Journey to work:*

The proportion of workers who drive to work by themselves within the city of Findlay was somewhat higher than in the United States as a whole (82.2 versus 76.1 percent), and the proportion who carpooled (9.6 percent) was somewhat lower than the 10 percent national average. Public transportation use within Findlay (.2 percent) is dramatically lower than the national average of five percent. Additionally, 3.4 percent of occupied households had no vehicles available versus 4.4 percent nationally. Mean travel time to work in Findlay is less than 15 minutes. This commute time is lower than county, state, and national averages.

*City Government:*

The Findlay City Council consists of the President of the Council, three At-Large Council members serving the entire city, and six Ward Council members serving the city's Wards. All Council members are elected to serve a two-year term (City of Findlay Website, http://www.ci.findlay.oh.us/?id=36, Retrieved November 2014). The city's Mayor, the Chief Executive of the city, is elected to a four-year term.

*Emergency Services:*

The Findlay Police Department was formed in 1887 and now consists of 73 sworn officers and 19 non-sworn support personnel. The Findlay Fire department has four fire stations organized into companies of four to seven firefighters who report directly to a Captain. The most current statistics for the call volume of the fire department is from 2012. In that year the fire department had a total of 2,043 calls, which was a decrease from 2011. Of the four stations, Station 1 received the most calls (737), followed by Station 2 (502), and then Stations 3 and 4 which received a similar call volume of 403 and 401, respectively (city of Findlay Fire Department Website, http://www.ci.findlay.oh.us/?id=122, Retrieved November 201).

The Hancock County Sheriff, as the chief law enforcement officer for the county, is responsible for servicing an area of approximately 534 square miles. This includes 1,185 miles of roadway, of which 217 miles are state highways, 534 miles are township roadways, and 434 miles are country roads. The Enforcement Patrol component consists of 30 sworn deputies and another five available sworn deputies in the Transport Warrant Division. The Hancock County Sheriff's Office's vehicle fleet consists of 25 patrol vehicles, nine vehicles for Transport Warrant, and six for detective use. (Hancock County Sheriff Website, http://www.hancocksheriff.org/aEnforcement.htm, Retrieved November 2014)

## 5.20 Environmental Justice

As with socioeconomic data, the five-year average (2008-2012) ACS data was queried to obtain relevant information associated with environmental justice. This ACS data is tabulated by the U.S. Census Bureau (USCB) and was procured from the national, state, county and local perspective in order to provide a multi-level geographical analysis (USCB, 2014a).

In order to identify whether the potential alternatives may disproportionately affect minorities or impoverished citizens, an analysis was conducted utilizing census block group maps for the study area with the USEPA's environmental justice viewer (USEPA, 2014b). These census tract maps were in-line with the local municipality averages outlined in the previous section. Detailed Block Group data was compiled using ACS 2010 data. The following information was collected from specific tracts and block groups to represent the study area.

- Racial and Ethnic Characteristics – race and ethnic populations in each census block of the study area were characterized using the following racial categories: Hispanic White (for which demographic data is reported as one category by the USCB), Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Persons of Hispanic Origin, and Other. These categories are consistent with the affected populations requiring study under Executive Order 12898.

- Percentage of Minority Population – As defined by the USCB, the minority population includes all non-Whites and White-Hispanic persons. According to Council of Environmental Quality (CEQ) guidelines, "Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis."

- Low-Income Population – The percentage of persons living below the poverty level, as defined in the 2010 ACS, was one of the indicators used to determine the low-income population in a given census block or tract. The median household income and per capita income were also used to characterize income levels.

Population characteristics are illustrated in Figure 5.20a with the percent minority by census block group. Additionally, Figure 5.20b shows the census block groups and percent below poverty.

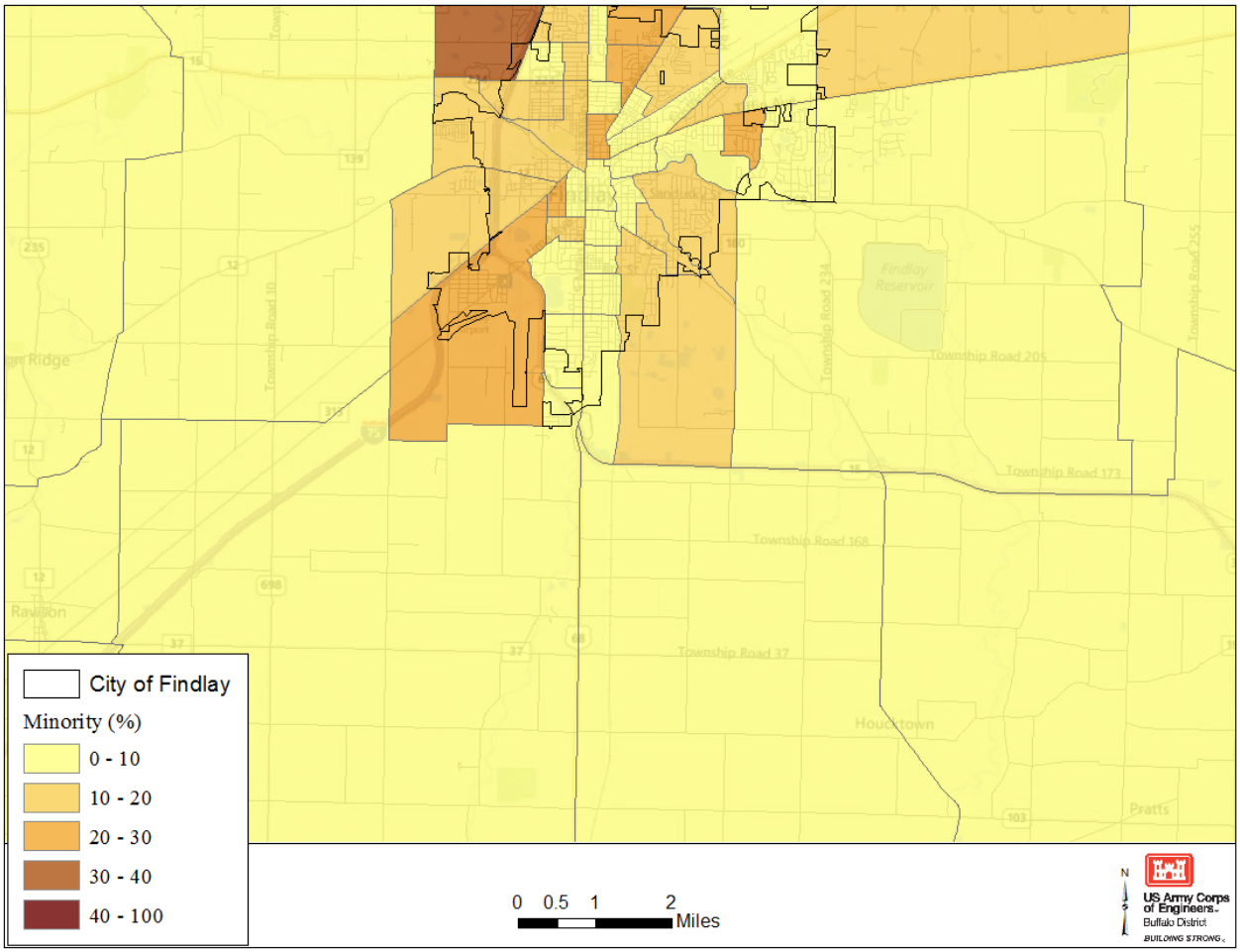


**Figure 5.20a. Percent Minority by Census Block Groups (EPA Environmental Justice Viewer, 2014)**

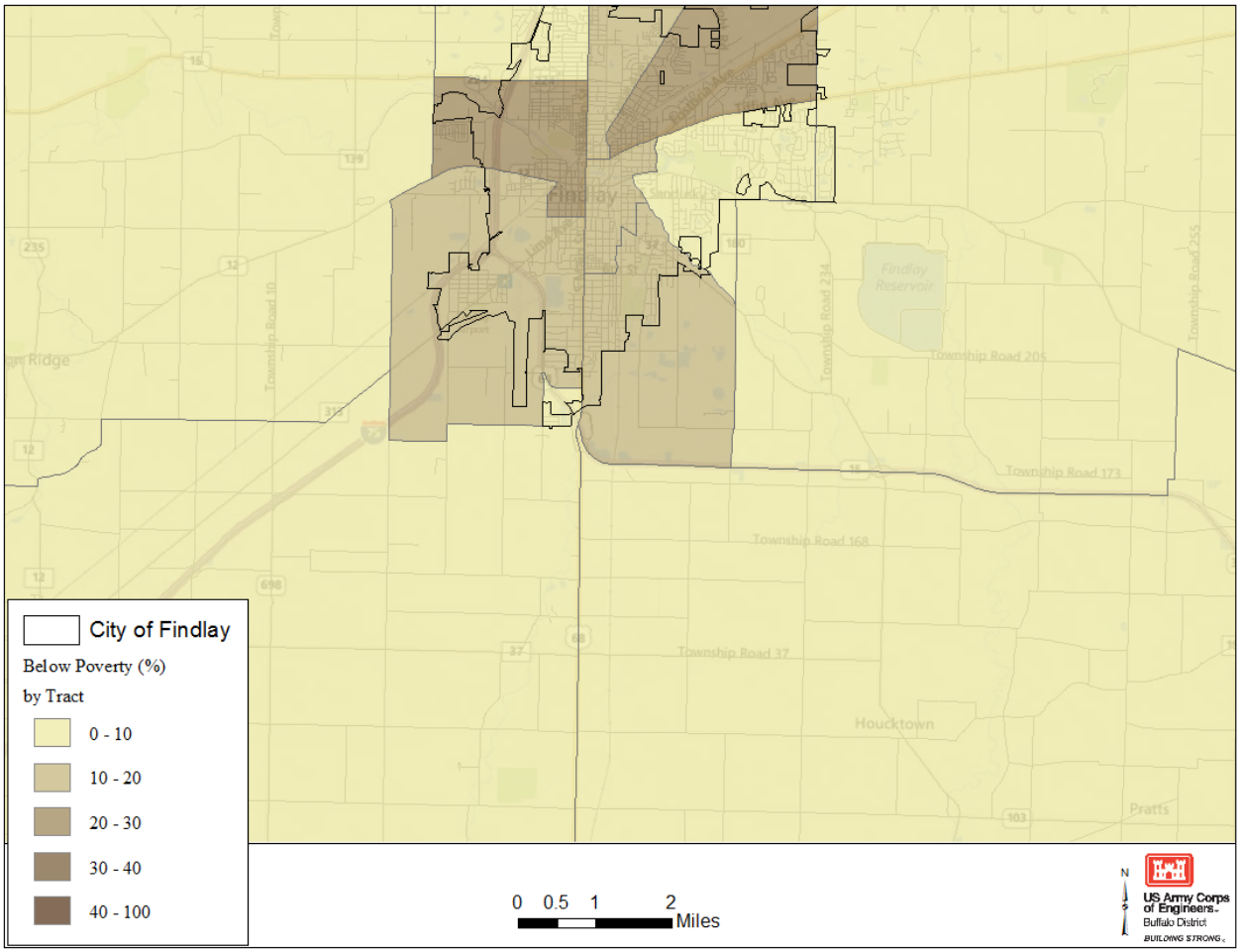


**Figure 5.20b. Percent Below Poverty by Census Block Groups (EPA Environmental Justice Viewer, 2014)**

## 5.21 Human Health and Safety

The Blanchard River Watershed has experienced flooding events throughout the past century. The biggest concern in the area is the frequent and serious flooding which inundates much of the high value downtown business districts as well as a large amount of the valuable farming community surrounding Findlay. The frequency and severity of these floods—most recently in 2006, 2007, 2008, 2011 and 2013—has caused extensive damage to the city and surrounding area. It has been common for water levels to remain above flood stage for several days during these historic flood events.

Two individuals have died in recent flooding events in the Blanchard River Watershed, one in 2007 and one in 2013. Loss of life is a significant concern regarding future flood events in the area. It is also important to note that workers associated with the post-flooding cleanup efforts can potentially be exposed to mold, waste materials, and other noxious irritants due to the floodwater inundating houses and commercial areas. With continued high water events, the risk for loss of life and exposure to hazards is expected to remain constant or increase.

## 5.22 Sustainability, Greening and Climate Change

Executive Order 13423, *Strengthening Federal Environmental, Energy, and Transportation Management* (January 24, 2007), directs federal agencies to conduct their environmental, transportation and energy-related activities in an environmentally, economically and fiscally sound and sustainable manner. The USACE strives to protect, sustain, and improve the natural and man-made environment of the Nation, and is committed to compliance with applicable environmental and energy statutes, regulations, and Executive Orders. Sustainability is an overarching concept that encompasses energy, climate change, and the environment to ensure that federal activities do not negatively impact resources for future generations. Proposed alternative plans must provide for sustainable solutions that address both short- and long-term environmental as well as social and economic considerations.

Greenhouse gases (GHGs) are components of the atmosphere that trap heat relatively near the surface of the earth and contribute to the greenhouse effect (or heat-trapping) and climate change. Most GHGs occur naturally in the atmosphere from natural processes and events, but increases in their concentration result from human activities such as burning fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide ($CO_2$), methane, nitrous oxides, and other GHGs to the atmosphere. Whether rainfall increases or decreases remains difficult to project for specific regions.

In 2010, the CEQ released draft guidance on when and how federal agencies should consider GHG emissions and climate change in NEPA analyses. This draft guidance includes a presumptive effects threshold of 27,563 tons of $CO_2$ equivalent emissions from a federal action annually (CEQ, 2010).

Climate change impacts within the study area would likely revolve around increased temperatures and further altered (flashier) hydrologic conditions. Any changes in hydrologic conditions occurring within the basin would likely result from less frequent but more intense warm-weather precipitation events, moderately to severely reduced summer flow conditions and degraded water quality, less winter ice cover and more cold-weather erosion events. The character of riparian habitats may also change and invasive species may move into the area with changing climate (Pryor et al., 2014). Extreme rainfall events and flooding have increased during the last century and these trends are expected to continue, causing erosion, declining water quality, and negative impacts on transportation, agriculture, human health, and infrastructure. The range and distribution of fish and other aquatic species will likely change, and an increase in invasive species would also likely occur (Pryor et al., 2014).

In the next few decades, it is expected that longer growing seasons and rising $CO_2$ levels would increase yields of some crops, though such benefits will be progressively offset by extreme weather events. Though adaptation options can reduce some of the detrimental effects, in the long term, the combined stresses associated with climate change are expected to decrease agricultural productivity (Pryor et al., 2014).

## 6.0 Plan Formulation

The feasibility study followed the six-step planning process defined in the Principles and Guidelines (P&G) which was adopted by the Water Resources Council, the Planning Guidance Notebook (ER 1105-2-100) and USACE SMART Planning guidance.

The purpose of the six-step planning process is to document a water resource problem or problems, inventory and forecast the conditions in the study area; formulate and evaluate a series of plans to ensure there is a public benefit and need to implement a plan and the final step is to recommend a plan that "fits" within the intent and goal of the study. The sections of this report generally follow the outline of an Environmental Impact Statement. Sections of the report relate to the six-step planning process as follows:

Step 1 – Identify the problems and opportunities

Section 4 outlines the problems and opportunities which are the basis for any planning process.

Step 2 – Inventorying and Forecasting conditions

Section 5 outlines the existing conditions and forecasted conditions are outlined in Section 8 under the no action alternatives in the Blanchard River watershed during the 50-year planning life of the project

Step 3 – Formulating alternative plans

Step 4 – Evaluating Alternative Plans

Step 5 – Comparing Alternative Plans

Steps 3 through 5 are addressed in Section 6 which outlines the measures considered for flood risk management, and the evaluation and comparison of the planning measures and alternative plans against criteria for evaluation.

Step 6 – Recommendation of a Plan

Section 7 outlines the recommended plan for flood risk management in the Findlay area.

Plan formulation is an iterative process that involves the development and screening of potential measures. Potential measures are combined into alternatives, which are evaluated and compared to other alternatives. This leads to the recommendation of an alternative plan and is then submitted for Congressional authorization and appropriation for the next phase of work.

A wide variety of management measures were developed that would address one or more of the planning objectives. These measures were evaluated and screened as described below.

Alternative plans were then developed which included one or more of the management measures. Through the planning process, plans were formulated as a result of analysis.

As mentioned previously, the alternative formulation process was started for the Ottawa area of the Blanchard River but was not completed since local officials chose to continue implementation of flood risk management measures without the assistance of the U.S. Army Corps of Engineers. Documentation of the measure identification and preliminary screening will be provided in a closure report to be provided to the village of Ottawa and the Maumee Watershed Conservancy District in the future under separate cover.

## 6.1 Flood Risk- Management Measures

### 6.1.1 Identification of Initial Measures

A management measure is a feature or activity at a site that addresses one or more of the planning objectives. Measures for inclusion in the Blanchard Watershed were evaluated based on their potential for flood risk reduction, relative development cost, environmental impacts, and acceptability by the sponsor.

No Action Plan, diversion channels, and levees underwent a thorough analysis. The descriptions and results of the evaluations of the remaining measures considered in this study are presented as follows:

Clearing and Snagging: This measure seeks to remove vegetation along the bank and includes selective removal of snags, drifts, or other obstructions from the natural channel. This measure is effective in reducing flood risk for low intensity, high frequency events and is generally not effective in reducing flood risk in high intensity, low frequency events which cause significant damages. In order for this measure to be continually effective, on-going operation and maintenance is required for proper functioning. This measure is currently being pursued by Hancock County using local funds and a $1 million grant through the Ohio Department of Labor.

Detention Basins – This measure seeks to retain a volume of water upstream of the affected community to be released after the flood event. Due to the widespread nature and flatness of the watershed, there are limited locations where placing detention basins would be economically feasible.

Channel Improvements – This measure addresses the under-capacity of the existing river channel. Improvements to the channel seek to increase capacity and lower the risk of flood events. Due to the flatness of the watershed and the low grade of the river, accommodating a large amount of flow would require a significant alteration of the existing channel. This option would be environmentally unacceptable due to significant impacts, and would also create an unacceptable impact on cultural resources.

High Velocity Channels – Due to the low grades in the Blanchard Watershed, the incorporation of high velocity channels are not technically feasible.

Diversions and Channel Relocations – This measure addresses the undercapacity of the natural channel and floodway during flood events by intercepting some measure of flow upstream of the impacted community and relocates the flow downstream of the impacted community.

Levees and Floodwalls – This measure reduces flood risk by containing the flow between levees/floodwalls. However, this measure results in some transferring of flood risk to another location. Locations of levees and floodwalls would also create significant impacts on cultural resources as well as come into conflict with known properties that contain HTRW which would require significant remediation and cost on the part of the non-Federal sponsor.

Non-structural Measures – This measure reduces flood risk by reducing damages to properties. Non-structural measures can include relocation, flood-proofing, or elevation of structures.

Bridge Removal/Replacement/Modification – Bridges and structures that are located in the channel and floodway impede the flow of flood waters and raise the flood surface elevations. However, the flood flows in the Blanchard watershed are primarily overbank flow due to the flat topography. Therefore, removal or modification of bridge structures will generally have a negligible impact on flood surface elevations with a high cost.

Evacuation of the Floodplain – This measure seeks to remove properties damaged from flooding lowering overall flood risk. Communities in the watershed, especially Findlay and Ottawa have been actively pursuing this option using FEMA Hazard Mitigation Grant Program (HMGP) funds and local funds to purchase properties and evacuate the floodplain.

Flood Warning and Emergency Measures – The communities in the watershed have installed a series of stream gages in the watershed and have implemented an early warning system to allow the community to make preparations for upcoming flood events.

### 6.1.2 Preliminary Screening Criteria

The alternative plans were screened by formulation criteria established in the Principles and Guidelines for Water Resources Projects (P&G): completeness, effectiveness, efficiency and acceptability.

- Completeness - Completeness is a determination of whether or not the plan includes all elements necessary to achieve the objectives of the plan. For a project to be successful in this area, it must meet all of the objectives for the project.

- Effectiveness - Effectiveness is a measure of the extent to which a plan achieves its objectives. All of the plans in the final array provided some contribution to the planning objectives.

- Efficiency - The cost effectiveness of a plan is expressed in net benefits and is a measure of its efficiency. All of the plans in the final array provided positive net benefits. Plans removed from consideration produced the same level of protection with fewer net benefits than other plans.

- Acceptability - Acceptability is acceptance of the plan by the local sponsor and the concerned public. All of the plans in the final array were in accordance with Federal law and policy. During the initial screening, measures which addressed flood risk reduction along the Blanchard River were also identified in the qualitative screening analysis. While some of the flood risk management measures may have met the criteria for completeness, effectiveness, efficient and acceptable, they were subsequently screened from further evaluation as the measures were implemented using another source of funding. Preliminary qualitative assessments for each measure were based on engineering judgment; professional experience and the screening criteria presented above.

Table 6.1.2a provides a preliminary screening of the measures

| Table 6.1.2a. Preliminary Screening of Measures | | | | | | |
|---|---|---|---|---|---|---|
| **Measure** | **Completeness** | **Effectiveness** | **Efficiency** | **Acceptability** | **Ecosystem Restoration Opportunities / Constraints** | **Decision** |
| **Detention Basins** | | | | | | |
| Blanchard River detention at multiple sites upstream of Findlay | Additional mitigation would be likely | Effectiveness in providing significant flood reduction could be limited because the identified sites control only a small portion of the basin drainage area and a large portion of the available storage volume would be required to meet new dam safety and freeboard requirements. | Not likely to be cost efficient for all locations. | No known issues | Opportunities may exist to enhance ecosystem functions (i.e., presence of increased aquatic and riparian habitat). | Recommended for further study (could be cost efficient and effective for some locations as a component of a larger plan) |
| Blanchard River detention upstream of the County Highway 205 bridge in the Marion Township | Additional mitigation would be likely | The elimination of the Blanchard River flow contributions to Lye Creek through containment and storage would reduce flooding along the overflow path and on Lye Creek and will reduce interior drainage volumes for the flood risk management projects downstream on Lye Creek near the City of Findlay. | Unknown | No known issues | Opportunities may exist to enhance ecosystem functions (i.e., presence of increased aquatic and riparian habitat). | Recommended for further study (could be cost efficient and effective for some locations as a component of a larger plan) |
| Detention upstream of various bridges in Eagle and Madison Townships as well as in several unincorporated areas of Hancock County | Additional mitigation would be likely | Would be effective in providing additional storage, reducing some degree of flood damages. | Unknown | No known issues | Opportunities may exist to enhance ecosystem functions (i.e., presence of increased aquatic and riparian habitat). | Recommended for further study(could be cost efficient and effective for some locations as a component of a larger plan) |

| Table 6.1.2 a- Preliminary Screening of Measures cont. | | | | | | |
|---|---|---|---|---|---|---|
| **Measure** | **Completeness** | **Effectiveness** | **Efficiency** | **Acceptability** | **Ecosystem Restoration Opportunities / Constraints** | **Decision** |
| **Evacuation of the Floodplain** | | | | | | |
| Large Scale Evacuation of the Floodplain – Various Locations | Additional mitigation would not likely be necessary | Would eliminate flood damages because at- risk buildings and infrastructure would be removed from floodplain areas. | Not likely due to very high costs and USACE criteria requiring flood free valuation for BCR purposes | Locally opposed | Opportunities would exist to enhance ecosystem functions | Not recommended for further study (incomplete, not likely to be cost efficient, and potential public policy issues) |
| Small Scale Evacuation of the Floodplain – Various Locations | Additional mitigation would be likely | Would eliminate flood damages for at-risk buildings and infrastructure that would be removed from floodplain areas; would have zero impact on damage reduction for remaining buildings. | Would likely be cost efficient for certain highly vulnerable buildings considered on a case by case basis as part of a larger project. | Has been locally supported in the recent past in some locations | Opportunities would exist to enhance ecosystem functions | Small scale structure acquisitions are **recommended** for further consideration as part of the development of non-structural measures (could be cost efficient and effective for some locations as a component of a larger plan) |
| **Channel Improvements** | | | | | | |
| Channel Widening and Deepening – Blanchard River, Findlay | Additional mitigation would be likely | Estimated to be effective in reducing the majority of flood damages in Findlay along the Blanchard, and a minor portion of the Eagle Creek damages. | Not likely to be cost efficient as a stand-alone measure due to encroachments in the City, flat slopes downstream, and the extremely hard dolomitic limestone along the channel bottom; earlier BCR was estimated to be below 0.8. | Tree removal may be unacceptable. Large scale property acquisition/ Demolition would be unacceptable | Ecosystem restoration measures would likely be necessary to offset impacts (i.e., adverse impacts to fish and wildlife habitat, including the Indiana Bat). | Not recommended for further study (would be effective, however: not a stand-alone solution, substantial costs compared to benefits due to flat slopes and dolomitic limestone channel bottom; acceptability issues; and substantial mitigation to offset impacts) |
| Channel Widening and Deepening – Eagle Creek | Technically infeasible due to close proximity of bedrock & numerous highway and railroad bridge crossings | Technically infeasible. | Not likely to be cost efficient. | Tree removal may be unacceptable. Large scale property acquisition/ Demolition would be unacceptable | Ecosystem restoration measures would likely be necessary to offset impacts (i.e., adverse impacts to fish and wildlife habitat, including the Indiana Bat). | Not recommended for further study (technically infeasible) |

| Table 6.1.2a - Preliminary Screening of Measures cont. | | | | | | |
|---|---|---|---|---|---|---|
| **Measure** | **Completeness** | **Effectiveness** | **Efficiency** | **Acceptability** | **Ecosystem Restoration Opportunities / Constraints** | **Decision** |
| Channel Widening and Deepening – Eagle Creek | Technically infeasible due to close proximity of bedrock & numerous highway and railroad bridge crossings | Technically infeasible. | Not likely to be cost efficient. | Tree removal may be unacceptable. | Ecosystem restoration measures would likely be necessary to offset impacts (i.e., adverse impacts to fish and wildlife habitat, including the Indiana Bat). | Not recommended for further study (technically infeasible) |
| Clearing and Snagging – Blanchard River, Hancock County | Additional mitigation would be likely. Extensive maintenance would be required | Limited effectiveness, especially for more extreme events | Unknown | Has been locally supported in the recent past. | Ecosystem restoration measures would likely be necessary to offset impacts (i.e., adverse impacts to fish and wildlife habitat, including the Indiana Bat). | Not recommended for further study as part of this Federal project - Hancock County is implementing this measure locally with grant funding |
| **High Velocity Channel** | | | | | | |
| High Velocity Channel | Technically infeasible | Technically infeasible due to lack of hydraulic gradient. | Not likely to be cost efficient; reduction in damages would be minimal due to lack of hydraulic gradient. | Could introduce a significant hazard during flood flows. | Ecosystem restoration measures would likely be necessary to offset impacts. | Not recommended for further study (technically infeasible) |
| **Diversions / Channel Relocations** | | | | | | |
| Diversion of Eagle Creek to Blanchard River – Aurand Run Alignment | Additional flow storage may be required to mitigate hydrologic impact. Habitat mitigation may be required. | Likely to be effective at reducing damage from the Creek and along portions of the Blanchard River | Unknown | No known issues | Ecosystem restoration measures would likely be necessary to offset impacts (i.e., net losses in channel length and associated habitat; farmland takings; residential displacements). Opportunities may exist to enhance ecosystem functions (i.e., restoration of aquatic habitat and riparian areas) | Recommended for further study (could be cost efficient and effective for some locations as a component of a larger plan) |
| Diversion of Eagle Creek to Blanchard River – West of Aurand Run Alignment | Additional flow storage may be required to mitigate hydrologic impact. Habitat mitigation may be required | Likely to be effective at reducing damage from the Creek and along portions of the Blanchard River | Unknown | No known issues | Ecosystem restoration measures would likely be necessary to offset impacts (i.e. net losses in channel length and associated habitat; farmland takings; residential displacements). Opportunities may exist to enhance ecosystem functions (i.e., restoration of aquatic habitat and riparian areas) | Recommended for further study (could be cost efficient and effective for some locations as a component of a larger plan) |

| Table 6.1.2a - Preliminary Screening of Measures cont. | | | | | | |
|---|---|---|---|---|---|---|
| **Measure** | **Completeness** | **Effectiveness** | **Efficiency** | **Acceptability** | **Ecosystem Restoration Opportunities / Constraints** | **Decision** |
| Cutoff existing diversion and provide additional detention near Route 205 in the Marion Township. | Yes if restoration is included in design. | Likely to have limited effectiveness in reducing damage. May increase some flows on the Blanchard River while reducing flows on Lye Creek. | Unknown | No known issues | Opportunities may exist in some cases to enhance ecosystem functions. | Recommended for further study (insufficient information available at this time to discount the possibility of this measure being a component of a workable solution) |
| **Levees and Floodwalls** | | | | | | |
| Levees and Floodwalls - Findlay | Additional measures would be needed to account for induced flooding upstream (and possibly downstream) and the interior of the line of protection. | Yes, though level of protection from interior flooding may vary throughout the project area. | Unknown | Interior drainage diversion, RR bridge modification, loss of trees and parkland may be issues. | Ecosystem restoration measures would likely be necessary to offset impacts (i.e., displacement of infrastructure and buildings, clearing of streamside trees, etc.). Opportunities may exist to enhance ecosystem functions (i.e., restoration of riparian areas). | Recommended for further study (could be cost efficient and effective for some locations as a component of a larger plan) |
| **Non-Structural Retrofits** | | | | | | |
| Non-Structural Retrofits, city of Findlay | Yes. Can be a stand-alone measure. | Certain nonstructural measures would be effective in reducing damage to buildings that have undergone treatments, but residual damages would still exist for unprotected buildings, infrastructure, etc. | Unknown | No known issues | Opportunities may exist in some cases to enhance ecosystem functions. | Recommended for further study (while efficiency depends on treatment and attributes of individual buildings, all other categories are scored favorably and further study is appropriate) |

| Table 6.1.2a - Preliminary Screening of Measures cont. | | | | | | |
|---|---|---|---|---|---|---|
| **Measure** | **Completeness** | **Effectiveness** | **Efficiency** | **Acceptability** | **Ecosystem Restoration Opportunities / Constraints** | **Decision** |
| **Bridge Removal / Replacement / Modification** | | | | | | |
| Removal of all bridges in the City of Findlay | Additional measures would likely be required. | Likely to have low impact on overall flood heights | Not cost efficient due to high impact on transportation cost. | This option may not be socially acceptable as bridge removals would disconnect the portions of the community on either side of the river | None | Not recommended for further study (likely to have little benefit and would create significant discontinuity and access issues in the community) |

| Table 6.1.2a- Preliminary Screening of Measures cont. | | | | | | |
|---|---|---|---|---|---|---|
| **Measure** | **Completeness** | **Effectiveness** | **Efficiency** | **Acceptability** | **Ecosystem Restoration Opportunities / Constraints** | **Decision** |
| Bridge modifications in Eagle and Madison Townships and several unincorporated areas of Hancock County | Yes. Can be a stand-alone measure with minor mitigation requirements. | Likely to have low impact on overall flood heights | May not be cost efficient due to low impact on overall flood heights | No known issues | None | Recommended for further study (insufficient information available at this time to discount the possibility of this measure being a component of a workable solution) |
| **Flood Warning and Emergency Measures** | | | | | | |
| Flood Warning and Emergency Measures – Findlay | Additional mitigation would be likely | Would not be effective in reducing flood levels, but a minimal degree of damages could be avoided through improved preparedness and response measures. | Likely to be cost efficient | Proven to be socially acceptable through recent local implementation | None | Not recommended for further study as part of this Federal project - Findlay already has a flood warning system and flood inundation mapping system as of February 2009 as a result of cooperative effort between the City, USGS, and NWS. |

| Table 6.1.2b Summary of measures screened from Further Consideration | |
|---|---|
| Measure | **Reason for Screening** |
| Large Scale Evacuation of the Floodplain – Various Locations | Not recommended for further study (incomplete, not likely to be cost efficient, and potential public policy issues) |
| Channel Widening and Deepening – Eagle Creek | Not recommended for further study technically infeasible and significant environmental issues |
| Channel Widening and Deepening – Blanchard River, Findlay | Not recommended for further study (would be effective, however: not a stand-alone solution, substantial costs compared to benefits due to flat slopes and dolomitic limestone channel bottom; acceptability issues; and substantial mitigation to offset impacts) |
| Removal of all bridges in the city of Findlay | Not recommended for further study (likely to have little benefit and would create significant discontinuity and access issues in the community |
| Clearing and Snagging in the Blanchard River | Not recommended for further study due to limited effectiveness at low frequency flooding events. |
| Flood Warning and Emergency Measures –Findlay | Not recommended for further study as part of this Federal project- Findlay already has a flood warning system and flood inundation mapping system as of February 2009 as a result of cooperative effort between the City, USGS, and NWS. |

### 6.1.3 Screening of Alternative Plans

After the initial qualitative screening occurred, a subsequent, more detailed screening was performed based on the accumulation of additional data. Generally, these measures were screened based on preliminary implementation cost and benefit analysis of the proposed measures. Generally, measures were screened out if the benefit to cost ratio (BCR) was less than 0.8. Generally, measures with a BCR less than 0.8 are judged to be considered inefficient (BCR >1.0) as additional analysis typically does not cause the measure to meet the efficiency criteria. The following measures were screened further and the results follow:

**Clearing and Snagging:**

As the Blanchard River is a low flow channel where damages from flooding result from overbank flow, clearing and snagging can be used to manage flood risk below the 0.2 ACE when the water elevation is largely within the river channel. Most flood damages in the area result from overbank flooding greater than the 0.1 ACE. For example, this measure was evaluated as part of the 1964 Survey Report and the 1987 GRR for the village of Ottawa. The project was assumed to begin at the downstream corporate limits of the village of Ottawa and extend to just upstream of the Grand Trunk Western Railroad Bridge. This measure was determined to provide a small decrease in flooding levels through Ottawa for lower-magnitude events (i.e., for the 0.50 ACE (2-year event), the cumulative decrease at Index Station 22.82 would be 0.7 feet, and 0.2 feet for the 0.002 ACE (500-year event). Similar results are expected for reaches of the Blanchard River closer to Findlay. This measure would require continued maintenance for minor, localized reductions in damages. As a result, clearing and snagging would have limited effectiveness in reducing damage from flood risk and does not meet the effectiveness criteria.

**This measure was screened from further consideration.**

**Detention Basins:**

Three sites were considered as part of the 1962 Survey Report for impounding of flood flows upstream from Findlay – two on the Blanchard River (one near Mount Blanchard and the other near Forest) and one on Eagle Creek (between Findlay and Arlington). At that time, a flood routing study of the 1913, 1950 and 1959 storms indicated that utilization of the maximum storage available at these sites would not reduce flood stages at Findlay to any appreciable degree, mainly due to small retention volumes due to the relatively flat terrain. The conditions do not appear to have changed since this report, as such detention basins in most locations upstream of Findlay do not meet the effectiveness criteria. An additional location on Eagle Creek that was not evaluated in the 1962 report was further evaluated.

**In-line detention along Eagle Creek in Hancock County:** Analysis indicated in-line detention structures may be cost-effective and would be part of the viable array of plans. However, an

initial screening of this measure indicated the measure would retain a small volume of water due to the relatively flat terrain resulting in a limited impact on reducing flood levels in the city of Findlay, and therefore would not meet the effectiveness criteria. . In addition, this alternative would have a significant impact on a large area of critical OEPA Category III wetlands, as well as critical habitat for local threatened and endangered species. Therefore, it is unlikely this alternative would meet the criteria of the Clean Water Act requiring selection of the Least Environmentally Damaging Alternative. USFWS and ODNR indicated that this measure would not be environmentally acceptable, and therefore would not meet the acceptability criteria.

**This measure was screened from further consideration.**

**Channel Projects**

**Channel Improvements(Channel widening and deepening):** Channel widening and deepening was considered for both the Blanchard River and Eagle Creek. A detailed study of the 35-mile reach downstream from Findlay as part of the 1962 Survey Report indicated that the flood profile has a slope of only 1.36 feet per mile available for modification to achieve stage reductions at Findlay. A general channel improvement of the 8.5-mile reach immediately downstream from Findlay would require excavation of about three feet of bedrock and was found to result in an significant reduction in Blanchard River damages but only a minor portion of the Eagle Creek damages. High costs would be associated with excavation for channel widening and deepening because of the limestone base, as well as associated land purchases, HTRW cleanup costs, building demolition and asbestos abatement, bridge modifications and structure and utility relocations that would be required. An index update of the costs indicates that the current annual costs would be exceed the without project damages, which would not meet the efficiency criteria. This updated cost does not include the cost of mitigating for impacts to 8.5 miles of river channel (including the complete loss of two miles of river channel), excavating the majority of the new channel into bedrock, utility relocation costs, and bridge demolition and modification. Considering the magnitude of environmental effects and the downstream hydrologic impact of such an extensive channel modification, the estimated costs for the measure would be significantly higher. In addition, this measure was also identified during conversations with Federal and State environmental resources agencies as being environmentally unacceptable, and therefore would not meet the acceptability criteria.

**This measure was screened from further consideration**

**High Velocity Channel :** High velocity channels have been eliminated from consideration because the flat stream gradients make them technically infeasible.

**This measure was screened from further consideration.**

**Diversions/Channel Relocations in Findlay:** Diversion of flow around Findlay is primarily focused on the Eagle and Lye Creek Tributaries. The initial screening has identified that the

Eagle Creek and Blanchard River peak flows are approximately coincident, and that diversion of Eagle Creek peak flows (while maintaining base flows) may provide a significant reduction of flood levels in Findlay. Several diversion channel alignments in the Findlay area were identified:

> Aurand Run Alignment (ARA): The Aurand Run alignment follows the existing channel for Aurand Run along the majority of its length. This measure would require removing the existing stream and constructing an engineered channel to convey flood flows and would require the reconstruction of a number of existing bridges. In addition, this measure would impact a significant length of streams and high quality wetlands. USFWS and ODNR both expressed their position this measure would not be environmentally acceptable. In addition, a Clean Water Act Section 404(b) analysis of this measure indicated that this would not be the Least Environmentally Damaging Practicable Alternative, which would not be in accordance with Federal law. Therefore, this measure would not meet the acceptability criteria.
>
> **This measure was screened from further consideration.**

Two additional diversion alignments, generally east of Aurand Run, were considered for further analysis:

> Western Diversion: Alternative 1 Alignment: This alignment was located east of Aurand Run and west of the other Alternative 2 alignment. Due to lower topography, this measure required significantly more rock excavation than the other two alternatives considered which would result in higher costs for the same benefit, which does not meet the efficiency criteria.
>
> **This measure was screened from further consideration.**
>
> Western Diversion: Alternative 2 Alignment: The western most diversion channel alignment, the location of this alignment was chosen for its relatively higher topography and deeper bedrock depth, resulting in a channel which was excavated in a primary soil profile, minimizing the amount of expensive rock excavation. This alignment had an initial BCR of greater than 1.0, and while there is opposition in the agricultural community, it is generally supported by the non-Federal sponsor, and meets the acceptability criteria. This measure is explained in greater detail in subsequent sections.
>
> **This measure was carried forward for further analysis.**

Alternative 1 and 2 alignments, which run primarily through prime agricultural lands, were developed to avoid or minimize the ecological impacts and to minimize rock excavation. Since diversions were considered to be the measure which most comprehensively achieved the overall planning goal and individual planning objectives for Findlay, the plan formulation process was

initiated with the evaluation of plans based on diversions and continued with plans incorporating additional measures or measures in lieu of diversions.

Consideration was also given to extending the diversion channel further east to the Blanchard River to better manage peak flows in the Blanchard River. The additional cost of extending the diversion channel, based on a per foot cost for the Alternative 2 Alignment diversion channel as an initial estimate, would be greater than the remaining project benefits, which does not meet the efficiency criteria. There is interest in the local community in proceeding with the diversion channel extension as a future non-Federal project (see Section 6.5).

**Blanchard River to Lye Creek Diversion Cutoff Levee:** During major flood events, overbank flooding from the Blanchard River enters Lye Creek south of the Findlay Reservoir, which contributes to flooding and significant flood damage along Lye Creek. This risk of diversion of flow can be managed by constructing a cutoff/containment levee between the Findlay Reservoir and State Route 15. Flood damage would be reduced along Lye Creek while areas along the Blanchard River above its confluence with Lye Creek would see an increase in flooding due to increased flow in the Blanchard. Areas along the Blanchard downstream of Lye Creek would also see a slight reduction in flooding as flow paths are increased by preventing the diversion of Blanchard River flows to the shorter flow path in Lye Creek. The BCR of this measure is greater than 1.0, which meets the efficiency criteria. While the potential for induced flooding in agricultural areas in the area of the levee is significant, initial analysis indicates the majority of impacts will be agricultural in nature. A more detailed real estate takings and compensability analysis for the induced flooding will be performed prior to the completion of the Final Feasibility Report/EIS which will give a more complete analysis of the impact of induced flooding as a result of this measure.

Properties which are determined to exhibit induced damages as a result of this measure, which at this time appear to be negligible, will be mitigated.

**This measure was carried forward for further analysis.**

**Levees and Floodwalls:**

Levees and floodwalls were key features of the selected plans in the Survey Reports completed for Findlay in 1962..

In Findlay, the effectiveness of levees is complicated by the large interior drainage contributions of Eagle Creek and Lye Creek. Tie-back levees for these tributaries would add over 9 miles to the line of protection, resulting in over 24 miles of levees in Findlay creating3 to 4 feet of induced upstream and downstream flooding. Assuming a relatively low height levee cost of $2,000 per foot resulted in an estimated cost of over $250 million without accounting for the costs of induced flooding or interior drainage. This estimate is about 3 times higher than without project damages. As a result, levees and floodwalls do not meet the efficiency criteria.

**This measure was screened from further consideration.**

**Nonstructural Measures**

**Non-Structural Retrofits:** Non-structural approaches (such as building elevation or flood-proofing) were determined to be appropriate for much of the area and potentially cost effective with the exception of the older construction typical in the area of downtown Findlay, especially with commercial structures. Initial analysis as a stand-alone measure indicated a BCR of greater than 0.8 at the 0.20, 0.10 and 0.04 annual chance floodplains (5-year, 10-year, and 25-year, respectively).

**This measure was carried forward.**

**Flood Warning and Emergency Measures:** Updated flood warning measures have recently been implemented. Therefore, there is no further Federal interest in this measure.

**This measure was screened from further consideration.**

**Evacuation of the Floodplain:** Evacuation of the floodplain effectively reduces flood damages but is generally not cost-effective or realistic as a comprehensive solution. In some locations, evacuation may be more appropriate than other non-structural measures and may provide additional restoration or recreation opportunities. Several areas were identified for potential evacuation including along the right bank of the Blanchard River between Main Street and the Norfolk & Southern Rail Bridge. Acquisition in this area would complement existing acquisition efforts by the city of Findlay, creating a more efficient floodway and allowing an extension of the existing riverfront park and walkway. In isolated instances, evacuation would result in a BCR of greater than 0.8, which meets the efficiency criteria.

**This measure was carried forward for further analysis.**

**Bridge Removal/Replacement/Modification:** Each bridge crossing in the Findlay areas were analyzed by the hydraulic model to estimate the amount of head loss as a result of flooding. In most cases, since the majority of flooding on the Blanchard River is due to overbank flow, head losses from the bridge were relatively minor and localized during the low frequency events which cause the majority of damages in the project area. Therefore, modifications of bridges are generally considered to be ineffective against all but minor, frequent flooding, and therefore does not meet the effectiveness criteria. The Norfolk Southern Railroad bridge, downstream of the Main Street bridge in downtown Findlay, exhibited head losses to an extent where modification may be effective and was carried forward for further analysis. When combined with additional flood risk management measures, the head losses were reduced to an extent where modification of this bridge was no longer considered effective and was also screened out.

**Bridge removal/replacement/modification was screened from further consideration.**

## 6.2 Formulation of Alternative Plans

After the qualitative and quantitative screening occurred, alternative plans were generated to create a viable array of plans for the Findlay area which addressed flood risk reduction. .A series of Flood Risk Management Plans were developed by combining screened measures. Previous analyses indicated that each of the plans addresses the identified problems and meets the screening criteria.

Plan F0 is the No Action Plan. Plans F1 through F5 include the Western Diversion of Eagle Creek. Plans F2 through F5 include the Blanchard to Lye Diversion Cutoff Levee, and Plans F3 through F5 include non-structural elements.

**Plan F0. No Action Plan.** This alternative reflects the current, or baseline condition. The purpose of including the no action alternative is to provide a consistent baseline for comparison against other alternatives, and to describe the flood impacts associated with not developing a flood risk management project. Consideration of the No Action Plan as one of the alternative plans to be considered as part of the final array of plans is required in order to comply with the requirements of the Nation Environmental Policy Act (NEPA) and Planning Policy (Engineering Regulation 1105-2-100). The Future Without Project condition and No Action Plan are synonymous terms, and it is assumed than no measure would be implemented by the Federal government to achieve the planning objectives. The No Action plan forms the basis for against which all other alternative plans are measured.

The planning period for this analysis is 50 years. It is assumed there would be a 10-year window for preconstruction, design and construction and the base year for implementation was 2027. The life of the project or period of analysis would be through the year 2077. The future conditions were assumed over this period.

With respect to the No Action Plan, it is necessary to project what the local community actions would be in the absence of a Federal flood risk management project and assumes a wide scale flood risk management project would not be implemented by the State or local agencies. As such, the local communities would continue to incur risks associated with long-term flooding.

The following critical assumptions were used in defining the No-Action Plan:

- The topography and soils would remain relatively unchanged.
- The Flood Damage Reduction Ordinance for the city of Findlay would be adhered to and future construction within the Special Flood Hazard Area (SFHA) would comply with the ordinance, FEMA regulations, and the National Flood Insurance Program (NFIP) requirements. Findlay's Flood Damage Reduction Ordinance prohibits construction of basements in the SFHA and requires first floors to be constructed at least 2 feet above the

highest adjacent grade. The Ordinance also prohibits construction in the floodway which would increase the base flood elevation, without compensatory measures. Construction in the floodplain requires a Floodplain Development Permit.

- The local sponsor will continue to pursue opportunities for implementation of evacuating the floodplain by purchasing and demolishing properties at times when funding is available (FEMA's Hazard Mitigation Grant Program (HMGP), state, or local funds).
- The city of Findlay will continue to expand, resulting in greater runoff.

There was reasonable risk associated with the project assumptions. Predictions of damages were based on over 50 years of gage data and included an evaluation of the effects of climate change, which has the potential to increase the intensity of rainfall events in Northwest Ohio. For each of the project assumptions, there was uncertainty for both under and over estimating the future flow. When all of the assumptions were modeled, the flow increase was relatively small and seemed reasonable given the characteristics of the watershed.

The Blanchard River watershed was very sensitive to economic damages with increased flows induced by the Future Without Project Condition assumptions. The Future Without Project Condition would have over 2,800 structures subject to flooding in the 0.01 annual chance event floodplain. In addition, average annual damages would be about $5.4 million. It was clear that, without a Federal investment, flood risk would increase over the next 50 years. Further information is given in the Economics Appendix.

**Plan F0: No Action Plan was carried forward for further consideration.**

**Plan F1. 0.01 Annual Chance Event Westward Diversion of Eagle Creek flow to downstream of Findlay (Diversion Channel Only Plan).** The diversion channel is located in farmland to the south and west of Aurand Run along the path of a downward elevation trend in the subsurface rock that was identified from a rock surface contour map developed from available borings (existing and project specific) and well logs. The plans include a diversion control structure to allow low flows to continue downstream in Eagle Creek, while higher flows are directed to the diversion channels. More detailed drawings are located in the Civil and Design Appendix.

The inline detention structure/dam would have the same general properties as the proposed levee with an earthen fill embankment and low permeability core (25-foot wide) in the middle of the structure with 3:1 side slopes to minimize the footprint while meeting both stability and seepage criteria. The layout includes a 25-foot wide roadway to provide access onto the dam.

The dam utilizes a low flow outlet to reduce peak flow and flooding downstream, and a spillway to accommodate larger flood events including the 0.002 ACE and Probable Maximum Flood (PMF). The low flow outlet will be located at the existing creek centerline. At the upstream end, the proposed culvert will include a trash rack. Downstream outlet protection will consist of riprap over filter fabric.

Flows in Eagle Creek downstream of the diversion structure will range from the 0.50 ACE flow (1,230 cfs) to 100 cfs during periods of anticipated flooding in the Blanchard. An analysis of these alternative flow approaches was conducted with respect to the potential impact on flow frequency distribution and sediment transport. Further information is located in Section 6.2 of the Hydrology and Hydraulics Appendix.

The proposed spillway is a Roller Compacted Concrete (RCC) step spillway with a concrete stilling basin for energy dissipation. The spillway is designed to provide approximately three feet of freeboard above the PMF. A 3-foot thick reinforced concrete wall will be required between the earthen embankment and the RCC spillway, extending to the top of the earthen section. The location of the diversion structure at the beginning of the channel was chosen to increase the elevation of the diversion which allows the channel to be constructed at a higher elevation with a minimum of rock excavation. At several points along the alignment the channel invert is close to the anticipated rock surface. Additional geotechnical data may identify higher rock elevations; however, a sensitivity analysis indicated that the additional rock excavation quantity would be fairly small and would not significantly alter the design.

The proposed Diversion Channel is approximately 9.3 miles long, has 35 to 47 foot bottom widths and a depths of around 10-16 feet (varies). The proposed alignment begins at Eagle Creek approximately 1,300 linear feet downstream of County Road 45 and flows in a westerly direction across County Road 45 and Township Roads 77, 76, and 67. Beginning approximately 500 feet to the west of Township Road 67, the alignment changes course to a northerly route across Township Road 50 and Interstate 75. It then continues in a westerly direction across County Roads 9 and 313, the Norfolk Southern Railroad and Township Road 10. Approximately 1,400 feet to the west of Township Road 10 it again turns north, running parallel to and crossing Township Roads 130 and 89 before discharging into the Blanchard River.

The annual net benefits for this plan was $601,800, resulting in a BCR of 1.22. However, the annual net benefits for this alternative is less than Plan F2. This plan is not as efficient as Plan F2,does not meet the efficiency criteria, and is screened from further consideration.

**Plan F1 was not carried forward for further consideration**

**Plan F1a. Blanchard to Lye Diversion Levee (Diversion Only Levee Plan).** The construction of an earthen levee across the existing floodwater flow path from the Blanchard River to Lye Creek was evaluated and combined with Plan F1, to form Plan F2. The levee embankment is approximately 9,800 feet long. The average height is about five feet with a ten foot top width. The alignment crosses both Township Road 173 and County Road 205. To meet the proposed levee grade County Road 205 will be raised six feet. Temporary access roads will be needed on both sides of County Road 205 to provide access for equipment and vehicles. The diversion cutoff levee will isolate approximately 11.2 acres of farmland between the levee and the Blanchard River. This area would be acquired as part of the Plan and expected to be used as part

of the plan to mitigate project impacts. The annual net benefits for this plan was $29,300, resulting in a BCR of 1.08. As the BCR was greater than 1.0 and meets the other screening criteria, this plan was carried forward for further consideration.

However, the annual net benefits for this alternative is less than Plan F2. Therefore, this plan is not as efficient as Plan F2 and does not meet the efficiency criteria and is screened from further consideration.

**Plan F1a was not carried forward for further consideration**

**Plan F2. (Plan F1 + Plan F1a) 0.01 Annual Chance Westward Diversion of Eagle Creek flow to downstream of Findlay and Blanchard to Lye Diversion Cutoff Levee.** This plan combines the Alternative 2 Alignment for the Western Diversion of Eagle Creek (Plan F1) with the Blanchard to Lye Diversion Cutoff Levee (Plan F1a). The annual net benefits for this plan was $671,600, resulting in a BCR of 1.22. As the BCR was greater than 1.0 and meets the other screening criteria, this plan was carried forward for further consideration.

**Plan F2 was carried forward for further consideration.**

**Plan F3 (Plan F2 + Non-Structural): 0.01 Annual Chance Westward Diversion of Eagle Creek flow to downstream of Findlay and Blanchard to Lye Diversion Cutoff Levee and Non-Structural Measures.** The various structural plans for Findlay only address a portion of the flood risk in the community. One approach considered to provide more extensive flood risk management in Findlay is to include building retrofits and buyouts of affected structures with Plan F2, the most comprehensive structural Flood Risk Management alternative. The non-structural plan included non-structural measures such as elevation or acquisition as well as evacuation of the floodplain based on the depth and extent of damages as a result of the various events. The nonstructural risk management features have been developed and analyzed at several scales, reflecting three different levels of annual flood risk. The plans are designated F3a through F3c, which represent non-structural improvements in the 0.20 annual chance event (5-year) floodplain, 0.10 annual chance event (10-year) floodplain, and the 0.04 annual chance event (25-year) floodplain, respectively. A series of different non-structural treatments were considered. More detailed analysis is located in the Economics Appendix.

For Plan F3a, the annual net benefits was $497,700, resulting in a BCR of 1.15. This plan was not carried forward for further consideration as it is not as efficient as Plans F2, or F3b.

For Plan F3b, the annual net benefits was $584,200, resulting in a BCR of 1.17. This plan was not carried forward for further consideration as it is not as efficient as Plan F2.

For Plan F3c, the annual net benefits was $276,200, resulting in a BCR of 1.07. This plan was not carried forward for further consideration as it is not as efficient as Plans F2, F3a or F3b.

**Plan F3 was not carried forward for further consideration.**

### 6.2.2 Final Array of Alternative Plans

After the initial formulation and screening of alternative plans, other than the Plan F0, No-Action Plan, Plan F2 resulted in the only plan which advanced to the next stage of formulation. In this stage, an analysis of the plan was performed such the diversion channel was scaled to accommodate several different storm frequencies. A HEC-FDA model and cost estimate were created to compare the plans as follows:

Plan F0, the No Action Plan is implicitly carried forward for this analysis for comparison. In addition, Plan F2 was also carried forward. Plan F2 has annual net benefits of $671,600, resulting in a BCR of 1.22.

**Plan F4: 0.02 Annual Chance (50-Year) Westward Diversion of Eagle Creek flow to downstream of Findlay and Blanchard to Lye Diversion Cutoff Levee and Non-Structural Measures.** This plan is the same as plan F2, except the diversion channel is sized to accept a 0.02 annual chance flood (50-year), instead of a 0.01 annual chance flood (100-year).

Plan F4 has annual net benefits of $567,700, resulting in a BCR of 1.19. As Plan F4 is not as efficient as Plan F2, this plan is not carried forward for further consideration.

**Plan F4 is not carried forward for further consideration.**

**Plan F5: 0.004 Annual Chance (250-Year) Westward Diversion of Eagle Creek flow to downstream of Findlay and Blanchard to Lye Diversion Cutoff Levee and Non-Structural Measures.** This plan is the same as Plan F2, except the diversion channel is sized to accept a 0.004 annual chance flood (250-year), instead of a 0.01 annual chance flood (100-year).

Plan F5 has annual net benefits of $555,300, resulting in a BCR of 1.17. As Plan F5 is not as efficient as Plans F2 or F4, this plan is not carried forward for further consideration.

**Plan F5 is not carried forward for further consideration.**

## 6.3 Action vs. No Action

There is a high risk that continual flooding in the Blanchard River watershed would result in adverse impacts to the community. Without federal involvement in the establishment of a flood risk management system in the Findlay area, the city would continue to be at risk from large flooding events and the affected community would be faced with continued economic development concerns, potential loss of life and physical damage to the study area. The problem is expected to worsen with time as a result of climate change as well as changes in land use within the watershed which would increase flows and flood damages.

The No Action Plan does not significantly alleviate risks to public health and safety. While some local emergency preparedness plans can be updated and general awareness of the risks can be increased, this could be considered an inappropriate small-scale response to significant life

and safety risks. In addition, the No Action Plan anticipates implementation of non-structural flood risk management measures, such as continued evacuation of the floodplain. Implementation of these measures does not significantly reduce flood risk in the community in comparison to the recommended plan.

The economic implications of the No Action Plan were negative. The investment at risk was so large that no Federal action would subject the study area to the possibility of an overall long-term adverse impact on the local economy. With an absence of flooding, the current trends in place for the local economy, tax base, population and employment may remain intact. However, if major flooding occurs, the long-term effects were likely to include diminished economic stability, business interruptions that could jeopardize workers' jobs and wages, potential losses in population and employment reductions in the tax base and generally diminished property values.

## 6.4 Risk and Uncertainty

Plan F2 would remove 69 percent of the average annual damages in the Findlay area. However, it would provide minimal protection in the event a storm is generally located over the Blanchard River and Lye Creek watersheds, with little rainfall in the Eagle Creek watershed.

Varieties of non-structural and structural measures were analyzed; however, the construction of the diversion channel and the Blanchard to Lye diversion cutoff levee is the only effective alternative to managing flood risk in the Findlay area. See Table 6.4: Summary of Residual Risks for a breakdown of how the plans would perform.

Table 6.4. Summary of Residual Risks

| | No Action | Plan F2 |
|---|---|---|
| Residual Annual Damages | $5,458,640 | $1,680,040 |
| Annual Damages Prevented | 0 | $3,778,600 |
| Reduction in Damages | 0 | 69% |
| Buildings Remaining in the 0.01ACE | 1,268 | 216 |
| Buildings Removed from the 0.01 ACE | 0 | 1,052 |

What follows is a list of the residual risks and their performance under each of the plans.

1. Project Performance – There would be a minimal performance of Plan F2 at time when storm events are located primarily over either the Blanchard River or Lye Creek watersheds upstream of Findlay, with minimal storm events located over the Eagle Creek watershed. The only protection afforded to the downtown area would be the slowing of flow through the Blanchard to Lye diversion cutoff levee.

2. Climate Change – The NOAA National Environmental Satellite, Data and Information Service (NESDIS) released a report in January 2013 that assessed climate trends and scenarios into the next 50–100 years for the Midwest region (Kunkel et al. 2013). The report indicates that over the period of hydroclimatological record for northwest Ohio, both temperature and precipitation

have trended above normal, especially over the last 40 years. To account for climate change, the forecast of future meteorological conditions in the region considers the past temperature and precipitation records, as well as the modeled future conditions in the area through 2070. According to the NESDIS report, a warming trend of about 3–6°F and a precipitation trend toward slightly wetter conditions can be expected over the next 50 years, although these estimates have significant uncertainty. Numerous reputable and peer-reviewed climate change syntheses, including Kunkel et al. (2013), suggest that a warming climate can cause an increase in extreme weather events with the risk of heavy precipitation and flooding. However, Small (2006) has shown that the increased precipitation in some areas of the Midwest is occurring during the fall causing increased low flows while high flows do not increase. USACE screening-level watershed vulnerability assessment for HUC 0410 showed that this watershed is among the 20% most vulnerable watersheds with regard to flood risk reduction and considering wet climate change scenarios. This vulnerability is primarily due to the cumulative and local flood magnification factor (FMF, Vogel et al. 2011). The cumulative and local FMF computed for the watershed (as of December 2014) are greater than 1.0 for wet and dry future conditions; indicating that flood magnitudes are expected to increase in the future.

Uncertainty in the Analysis – Risk and uncertainty are intrinsic in water resources planning and design. All measured or estimated values in project planning and design are best estimates of key variables, factors, parameters and data components. These estimates are the “most likely” values. The true values of planning and design variables and parameters are not certain and could take on a range of values. Those in the current study were based on short periods of record, small sample sizes and measurements that were subject to error. Uncertainty was shared across the plans equally, making the likelihood of a incorrect decision low.

The likelihood of a parameter taking on a particular value by a probability distribution could be described. In the hydrologic and hydraulic analysis, there is uncertainty in the rain gage data and historical stream gage data. See the Hydrology and Hydraulics Appendix. In the economic analysis, areas of uncertainty in the analysis included first-floor elevations from surveys, structure values, content values, vehicle values, H&H exceedance probabilities, stage discharge function and the depth-percent damage functions. Ranges of uncertainty for all of these functions were entered into the HEC-FDA program. Values for EAD were calculated with uncertainty as described in the Economic Appendix.

## 6.5 Betterments

Extension of the diversion channel from Eagle Creek to the east to connect with the Blanchard River south of State Route 15 was considered during plan formulation and was screened out as it was not considered to meet the efficiency criteria. There is local interest for consideration of this extension as a non-Federal project. If the non-Federal sponsor chooses to construct this extension, it would be considered a betterment and the non-Federal sponsor would be responsible for contributing 100% of the difference in the design and construction cost between the

recommended plan and the expansion of the project to accommodate the diversion channel extension. The contribution of the funding required to facilitate this work would be defined in the Project Partnership Agreement and the appropriate funding would be requested.

# 7.0 Selection and Description of the Recommended Plan

## 7.1 Plan Selection

Federal policy requires that the feasibility study identify the plan that reasonably maximizes net NED benefits consistent with protecting the environment. This NED Plan must be recommended for implementation unless there are overriding reasons for recommending another plan.

The NED Plan was determined by evaluating the net economic benefits for each individual plan. The NED Plan is Plan F2.The Recommended Plan is the NED plan as it provides the highest net benefits while meeting the planning objectives.

## 7.2 Plan Components

Plan components for Recommended Plan include the following features: diversion channel of Eagle Creek which has been designed to flow around the city of Findlay and a containment levee along the Blanchard River that will limit the amount of overland flow of Blanchard Creek floodwaters into Lye Creek. Figure 7.1 provides an overview of the components which make up the recommended plan.

The diversion channel will extend approximately 9.4 miles and will consist of a trapezoidal channel which has a bottom width of 35 to 47 feet and is approximately 10 to 16 feet deep. This has been designed to maximize the drainage area controlled by the diversion channel. The channel begins at Eagle Creek approximately 1,300 feet downstream of County Road 45 and flows in a westerly direction across County Road 45 and Township Roads 77, 76 and 67. From there, the alignment shifts course to a westerly direction approximately 500 feet west of Township Road 67 where it then flows in a northerly direction across the Township Road 50 and Interstate 75. The channel then turns toward the west where it continues across County Roads, 9 and 323, the Norfolk southern Railroad and Township Road 10. The alignment then crosses back north approximately 1,400 feet to the west of Township Road 10, where it runs parallel to cross Township Road 120 approximately 2,900 feet to the south of Township Road 90. After crossing Township Road 130 the channel continues along a northerly path and discharges into the Blanchard River approximately 1500 feet west of Township Road 130 after crossing Township Road 89.

The alignment of the diversion channel was established based on existing HTRW information known, review of soil and rock maps and aerial mapping and the review of property information to minimize property and structure impacts. Future changes to the alignment will occur during the optimization phase of the project which will factor HTRW concerns including oil well

locations, bridge locations, public comments, and other unforeseen site conditions.

Since the diversion channel is 9.4 miles long; the alignment crosses Township Roads (TR) 89, 130,10, 77, 76, 67 and 49; County Roads (CR) 9, 313, 84 and 86; State Route 12, Interstate 75 and the Norfolk Southern Railroad. Five roads with average daily trips (ADT) of less than 200 per day, identified as Township Roads 89, 130, 10, 76, and 49 (200 ADT = 100 vehicles per day), would cross the diversion channel by using dry crossings or would be converted to cul-de-sacs. These crossings would likely be composed of a raised roadbed with culverts to permit small amounts of water to pass under the roadways. During significant rain events where the diversion channel would be used, generally considered to be less than 95% of the available days of the year, these crossings would be gated and closed to traffic. Generally, traffic disruptions of less than 200 ADT are considered to be of minimal impact. A final decision to cross or convert the roads would be determined in a subsequent phase of the study, prior to completion of the Final Report/EIS. Eight bridges are necessary to maintain traffic over the proposed diversion channel where it crosses Township Road 67 and County Roads 9, 313, 84 and 86; State Route 12, Interstate 75 and the Norfolk Southern Railroad. The bridge layouts were developed using Ohio Department of Transportation's (ODOT) Location and Design Manual and evaluation of traffic data in the area.

The distance from the roads that are currently anticipated to be composed of dry crossings to a bridged crossing are as follows:

Table 7.2: Approximate Distance from Dry Crossing to Nearest Bridge Crossing

| Dry Crossing | Approximate Distance to Nearest Bridge Crossing |
|---|---|
| TR-89 | 1.25 miles |
| TR-130 | 1 mile |
| TR-10 | 0.5 mile |
| TR-76 | 1 mile |
| TR-49 | 1 mile |

The above distances are generally not considered to be a significant impact on traffic or on the availability of emergency services in the area. In addition, diversion of traffic that would normally utilize these crossings would not have a noticeable impact on the level of service of roadways in this area. The low crossings would be constructed from material excavated from the diversion channel.

The Blanchard to Lye overflow cutoff levee would prevent flood waters from overflowing into Lye Creek from the Blanchard River, thus protecting low-lying areas on the downstream end of Lye Creek. A comparison of model results for the TSP versus existing conditions, however, indicate an area of 1,579 acres may be impacted by induced flooding for the 1% annual chance (100-year) event. That is, an area of 1,579 acres would be expected to experience higher flood depths for that event. Model results indicate the increase in the peak flood depth varied

significantly over the area, from 0.01 feet to as much as 4 feet, for the 1% event. The area impacted by induced flooding is primarily agricultural. However, some residential areas in the city of Findlay may see increased flood elevations. However, at this time, significant induced damages to structures as a result of a rise in flood surface elevation is not anticipated. Determination of induced damages and where the damages rise to the level of a taking will require more detailed surveys which will not be performed until the PED phase of the project. Additionally, peak flows downstream of where the diversion channel re-enters the Blanchard, are expected to rise by approximately 250 cfs. This is less than 2% of the total flow in the Blanchard River during the 0.01 annual chance flood event and is not expected to significantly impact water surface elevations downstream of the diversion channel confluence with the Blanchard River. During plan optimization and the PED phase, changes to the project design to reduce the additional flow of the channel and diversion structure will be performed.

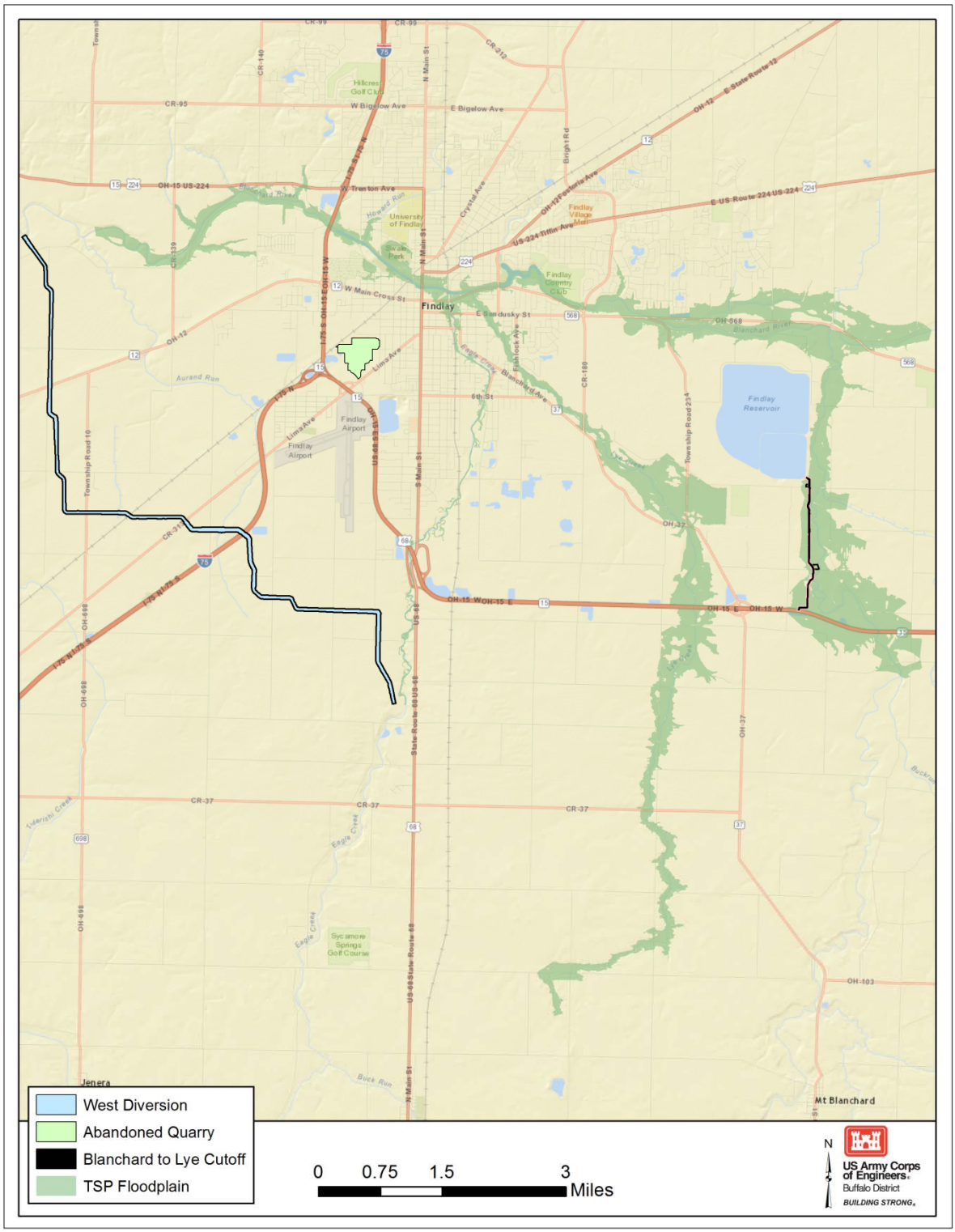


**Figure 7.1. Overview of the recommended plan.**

## 7.3 LERRD Considerations

The Lands, Easements, Rights of Way, Relocations, and Disposal areas (LERRDs) identified in

The Real Estate Appendix outlines the minimum LERRD required to construct, operate and maintain the recommended alternative. They are tentative in nature and will continue to change throughout optimization and final project design. It is estimated that the non-Federal sponsor will be required to acquire an estimated 253 acres of channel improvement easements, flood protection levee easements, occasional flowage easements, utility and pipeline easements, temporary work area easements as well as acquire a disposal site for approximately 2.9 million cubic yards of excavated material. There are also approximately 22 acres of potential wetland and 46 acres of stream mitigation areas that will be required. Eight new bridges will be constructed to accommodate traffic where the alignment crosses roadways. For those roads the diversion channel will cross but bridges are not expected, dry road crossings will be constructed or the roads will be terminated. The non-Federal sponsor will be responsible for the relocation of fiber optic cables and oil and gas pipelines if they remain in the project footprint. Any required relocations will be performed in accordance with the Uniform Relocation Act and P.L. 91-646 which provides for the fair and equitable treatment of persons whose property is acquired or who will be displaced because of programs or projects financed with Federal funds. An Attorney's Takings Analysis will be performed during optimization to determine if the levels of induced flooding require additional real estate interests to be acquired. The total estimated real estate costs for the Recommended Plan are $20,123,000 for the West Diversion- Alternative 2 alignment and $4,941,100 for the Blanchard to Lye Cutoff Levee. These estimates are tentative and will be modified during optimization once a final alignment is known and will be based on SMART Planning appraisal standards.

The Detroit District Real Estate Division will coordinate, monitor and assist with all real estate activities undertaken by the non-Federal sponsor. The Real Estate Division will assure that the acquisition process is conducted in compliance with Federal and State Laws, specifically, the requirements under the Federal Uniform Relocation and Acquisition Act (P.L. 91-646).

## 7.4 Mitigation and Adaptive Management

The USACE Planning Guidance Notebook (ER 1105-2-100) describes the mitigation process and procedures and content of mitigation plans to be included in feasibility-level reports. The planning of USACE projects must ensure that project-related adverse environmental impacts (i.e., impacts on fish and wildlife resources) have been avoided or minimized to the extent practicable, and that remaining unavoidable significant adverse impacts are compensated to the extent justified. Under Section 2036(a)(3)(B) of WRDA 2007, Public Law No. 110-114, Section 2036(a)(3)(B), 121 Stat. 1093 (2007), USACE must fully develop a mitigation plan that includes the following: (1) monitoring until successful, (2) criteria for determining ecological success, (3) a description of available lands for mitigation and the basis for the determination of availability, (4) the development of contingency plans (i.e., adaptive management), (5) identification of the entity responsible for monitoring, and (6) establishing a consultation process with appropriate Federal and state agencies in determining the success of mitigation.

A draft Mitigation Plan is appended to this report.. Mitigation banks and in-lieu fee mitigation programs were investigated that cover the Blanchard River Watershed as potential compensatory mitigation options for the proposed unavoidable impacts to wetlands and streams by the TSP. At this time, the White Star Expansion Area, which is operated by the North Coast Regional Council of Park Districts, 12882 Diagonal Road, LaGrange, OH 44050 is the only wetland mitigation bank that has a service area that covers the Blanchard River Watershed, however, it only has 16 credits of forested wetlands available and thus is insufficient to compensate for the proposed wetland impacts. The Nature Conservancy has an approved in lieu fee program for both wetlands and streams in Ohio. There are currently 10,000 LF of stream credits available and 20 credits of wetland mitigation available within the Blanchard River Watershed. The wetland credits are insufficient to offset the proposed wetland impacts and the stream mitigation credits are $390 per linear foot which is considerably more than the estimate assumed for permittee responsible stream mitigation ($100 per linear foot). This coupled with discussions with USFWS, OEPA, and ODNR, it was proposed that on-site mitigation, or off-site mitigation in close proximity to the proposed impacts, would be a preferred method to compensate for the unavoidable wetland and stream impacts. For wetland impacts, a ratio of approximately 2:1 (acres) has been used and for stream impacts a ratio of approximately1.5:1 (linear feet) has been used. Estimated costs for each, based on Mitigation Banks in the area and consultation with USACE Regulatory, are $25,000 per acre for wetland mitigation and $100 per linear foot for stream mitigation. The Corps is proposing to enhance approximately 9,094.15 linear feet of highly modified stream channels by adding floodplain benches and forested/scrub-shrub/emergent riparian buffer along approximately 1,446.41 linear feet of Aurand Run and 7647.74 linear feet of Lye Creek. This will improve habitat within the stream and help to connect woodlots to serve as a riparian corridor for both aquatic and terrestrial fauna and serve to offset the proposed permanent impacts from the TSP and result in no net loss of stream habitat within the Blanchard River Watershed. The Corps is proposing to restore at least 23.2 acres of forested/scrub-shrub wetlands (2:1 mitigation ratio) adjacent to the Blanchard River as compensatory mitigation to offset the unavoidable impacts to freshwater wetlands and ensure that there are no net loss of the functions and values of these special aquatic sites. We will use “Guidelines for Wetland Mitigation Banking in Ohio” to develop habitat restoration planting plans, success criteria, and monitoring protocols. Develop and implement remedial actions if/when habitat restoration areas do not achieve success criteria. Due to the inability to obtain rights of entry, it is expected that the Mitigation Plan for these wetland and stream impacts would not be finalized until after completion of the feasibility study.

ER 1105-2-100 requires that mitigation plans be analyzed for cost effectiveness and incremental cost and benefits. Analysis of cost effectiveness, in general, compares the relative costs and benefits of alternative mitigation plans. The least expensive plan which meets the restoration objective is usually selected. “Incremental Cost Analysis” is the technique used by USACE to develop cost effective mitigation plans. Incremental cost analysis calculates the cost per unit of output gained by each successive feature, allowing the planning team to determine the point of

diminishing returns. The mitigation plan does not currently include a Draft Cost Effectiveness Incremental Cost Analysis Report due to a lack of site access. Thus we have developed appropriate mitigation ratios and costs mentioned above based on coordination with state and Federal natural resource agencies and average mitigation costs for stream and wetland mitigation in the state of Ohio.

## 7.5 Cost Sharing Agreements

A Project Partnership Agreement (PPA) must be executed between USACE and the non-Federal sponsor. This document defines the responsibilities of the non-Federal sponsor for construction as well as defines the future operation and maintenance, repair, replacement and rehabilitation which will required after the construction of the project. The non-Federal sponsor for the construction of this project could be the existing sponsor, Hancock County, or a conservancy district having jurisdiction in this area, such as the Maumee Watershed Conservancy District.

The Maumee Watershed Conservancy District will most likely be the non-Federal sponsor for the Preconstruction, Engineering and Design phase and for the construction of the project. Under Chapter 6101 of the Ohio Revised Code, the Maumee Watershed Conservancy District is considered a political subdivision of the state of Ohio and has the authority to make special assessments and to charge levee fees for design, construction, and operations and maintenance. Additional authorities include the ability to pursue eminent domain actions and provide the operation and maintenance which is required to ensure proper functioning of the project.

## 7.6 Design and Construction Considerations

Once the final report is approved by the Chief of Engineers and Congress authorizes the project, construction funds must be appropriated. After appropriation occurs, design activities will commence.

During the construction phase, it is anticipated soil will be needed to be removed in order to construct the diversion channel; and that there will be the need for tree and vegetation clearing operations. Since a diversion channel is part of the plan, soil and rock excavation will be required and it is intended that the excavated soil will be hauled to an abandoned quarry that has been converted into a construction landfill within the city of Findlay limits. Concrete forming and pouring may be needed for the construction of the inline diversion control structure and for work on bridge abutments. With respect to the dry river crossings, asphalt will be required. Construction considerations will be elaborated upon in greater detail during the optimization phase of the study and documented in the Final Feasibility Report.

## 7.7 Operation and Maintenance Considerations

The recommended plan for the city of Findlay would require operations and maintenance of the following components of the flood risk management project: diversion structure at Eagle Creek,

the Western Diversion Channel which starts at the confluence of Eagle Creek and extends through rural Hancock County where it flows into the Blanchard River west of the city of Findlay, and the Blanchard to Lye diversion cutoff levee.

The inline diversion control structure requires operations and maintenance consistent with typical USACE control structures. This includes, but is not limited to exercising and repairing slide gates, repairing box culverts, repairing up and downstream retaining structures, repairing replacing riprap, removing vegetation and obstructions, removing encroachments (trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area), maintaining earth embankment, and repairing the overflow weir.

The diversion channel requires operations and maintenance consistent with typical USACE flood damage reduction channels. This includes, but is not limited to removing vegetation and obstructions, removing shoaling to maintain channel capacity, removing encroachments (trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area), repairing erosion, repairing or replacing riprap, and repairing or replacing revetments other than riprap.

The Blanchard to Lye Diversion Cutoff Levee requires operations and maintenance consistent with typical USACE levee systems. This includes, but is not limited to removing unwanted vegetation in the Vegetation Free Zone (VFZ), maintaining adequate sod cover, removing encroachments (trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area), maintaining slope stability, repairing erosion, repairing settlement, repairing depressions/rutting, repairing cracking, maintaining an animal control program and repairing animal burrows, repairing or replacing riprap, repairing or replacing revetments other than riprap, maintaining relief wells/toe drainage systems, and repairing seepage. Mowing of the sod cover on the levee prism to maintain proper grass height will be required. Pipes through the levee will require pipe video inspections with engineering recommendations every 5 years.

The recommended plan features interior drainage systems (culverts, ditches, outfalls, etc.) throughout the entirety of the project. These features require operations and maintenance consistent with typical USACE interior drainage systems. This includes, but is not limit to removing vegetation and obstructions, removing encroachments (trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area), maintaining fencing and gates, repairing or replacing riprap, repairing or replacing revetments other than riprap.

Other general items required are the development of an Operation and Maintenance Manual which will be completed by USACE after the project is constructed. This document outlines and defines the provisions for the successful operation and maintenance of the project and will include documents such as a copy of the Project Partnership Agreement, As-built drawings, guidance on inspections, and inspection checklists. Annual joint inspections of the project will

be conducted and the conditions of the project will be documented.

## 7.8 Implementation Requirements

### 7.8.1 Institutional Requirements

All USACE projects must comply with all applicable environmental statutes and policies. The schedule for project implementation assumes authorization in 2018 in accordance with the provisions in Section 7002 of the Water Resources Reform and Development Act of 2014. After project authorization, the project will be eligible for construction funding. It will be considered for inclusion in the President's budget based on national priorities, magnitude of the Federal commitment, economic and environmental feasibility, level of local support, willingness of the non-Federal sponsor to fund its share of the project cost, and any budget constraints that may exist at the time of funding.

Prior to the initiation of any detail design activities, authorization of the project and the appropriation of project funds are required. Time for real estate acquisition was also a schedule consideration. If project authorization is received in 2018, it is anticipated construction may be initiated in 2022. The generation of this schedule was based on continued and sufficient Congressional appropriations beginning in 2019 to construction completion. The Preconstruction, Engineering and Design (PED) phase will be to perform technical evaluations which will assist in completing the detailed design for the project. The technical investigations which will be required to be conducted in the next phase may include, but are not limited to, the following: threatened and endangered species studies, wetland delineation studies; archeological investigations and geotechnical investigations.

Once Congress appropriates Federal construction funds, USACE and the non-Federal sponsor would enter into a Project Partnership Agreement (PPA). This PPA would define the Federal and non-Federal responsibilities for implementing, operating and maintaining the project.

Following the signing of the PPA and the design approval, USACE would officially request the sponsor to acquire the necessary real estate. The advertisement of the construction contract would follow the certification of the real estate acquisition and right-of-entry. The final acceptance and transfer of the project to the non-Federal sponsor will follow the delivery of an operation and maintenance manual and as-built drawings.

Assuming full funding, the project will be fully constructed by the year 2027 as displayed in Table 7.8.1: Implementation Schedule.

| Table 7.8.1 Implementation Schedule | | |
|---|---|---|
| **Activity** | | **Date** |
| Draft Detailed Project Report (DPR) and Environmental Impact Statement (EIS) | | April 2015 |
| Agency Decision Milestone | | August 2015 |
| Civil Works Review Board | | January 2016 |
| Final DPR and EIS | | January 2016 |
| Chief's Report | | March 2016 |
| Record of Decision | | July 2016 |
| Congressional Authorization | | January 2018* |
| Execute Project Partnership Agreement | | Fiscal Year 2018** |
| Congressional Appropriation | | Fiscal Year 2019 |
| Pre-Constructin, Engineering and Design (PED) | | Fiscal Years 2019-2013 |
| Real Estate Acquisition | | Fiscal Years 2020-2024 |
| Construction | | Fiscal Years 2022-2027 |
| *Per Section 7002, WRDA 2007<br>**Balance of Schedule is dependent on Congressional Authorization | | |

### 7.8.2 Preliminary Estimated Implementation Cost and Apportionment

The sponsor is responsible for the LERRD which is included in the sponsor's share of the construction cost. Items included in the LERRD total include the land to construct the project and the relocation of roads, bridges, and utilities. Costs for HTRW cleanup is not a Federal responsibility and is not included in the estimate project implementation costs. Table 7.8.2 shows the preliminary estimated implementation cost of the recommended plan and cost apportionment for the breakdown down of project costs between the Federal government and non-Federal sponsor. This estimate is based on the costs for construction and costs associated with LERRDs using 2014 price levels. This cost includes the contingency from the Abbreviated Risk Analysis. Project costs will change during the optimization phase of the project. In addition, a more detailed Cost and Schedule Risk Analysis will be performed to update the cost contingency. These costs will change as the study progresses through the optimization phase and should only be used as a guide to evaluate the magnitude of the investment required for implementation.

| Table 7.8.2 Est. Implementation Cost and Apportionment | | | |
|---|---|---|---|
| | Estimated Implementation Cost | Non-Federal Sponsor Contribution (Implementation Cost) | Federal Contribution (Implementation Cost) |
| LERRD | $25,064,000 | $25,064,000 | $0 |
| CASH | $51,270,000 | $3,597,000 | $43,278,000 |
| Minimum 5% | | $3,597,000 | |
| Additional Cash Requirement | | $0 | |
| Total | $71,393,000 | $28,661,000 | $43,278,000 |
| Cost Share | | 40% | 60% |

### 7.8.3 Permits

Requirements for Section 404 of the Clean Water Act of 1972, as amended, will be met prior to any construction activity, as will any permit requirements of Ohio EPA for the construction activity in the stream channel. A draft 404(b)(1) guidelines form is included in the Environmental Appendix.

## 8.0 Assessment of Environmental Impacts

This section presents information concerning the anticipated environmental effects of the project measures/alternatives, and the impacts to the existing and future without project conditions discussed in Section 8. In the interest of clarity, impact considerations are organized for the No Action Alternative (Plan F0) and on a per measure basis, as well as presenting an overall impact anticipated for the Recommended Plan (Plan F2). While the Aurand Run Alignment is not being considered as a viable project measure, the impacts of this measure are still being described where appropriate to elucidate the differences between impacts associated with this measure and the Alternative 2 Alignment (Plan F2).

Assessing the potential impacts of these measures proved difficult in some instances because of an inability to access all properties within the study area. For example, impacts to wetlands were only estimated using readily available information (e.g., mapping) since on-site wetland delineations could not be performed. While all available information concerning the pertinent

public interest categories were considered within the project area, any updated or new information concerning these public interest categories is not expected to alter the project planning decision. Updated public interest information could, however, lead to changes in the level of mitigation associated with project implementation. With such limitations in mind, a summary of expected project impacts on environmental and social factors is provided in Table 8.0, while a more detailed discussion concerning potential impacts from the future with and without project conditions are provided in sections 8.1 through 8.23. The impacts discussed within each of the sections below are categorized as follows:

- Minor – effect to the environmental or social factor that is barely measureable and/or perceptible and is localized to a relatively small area within the project footprint.
- Moderate – effect is clearly noticeable and could have an appreciable effect on the discipline or resource and/or perceptible on a scale ranging from local to throughout the project area.
- Major – effect would have a substantial, highly noticeable influence on the resource or discipline and is measurable and/or perceptible on a scale ranging from local to regional.

| Table 8.0. Summary of Effects on Resources and Completeness of Data | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Public Interest Category/Measure** | **No Action** | | **West Diversion Alignment 2** | | **Aurand Run Alignment** | | **Blanchard to Lye Cutoff** | |
| | **Summary of Effects** | **Data Completeness** | **Summary of Effects** | **Data Completeness** | **Summary of Effects** | **Data Completeness** | **Summary of Effects** | **Data Completeness** |
| Land Use | o | H | - | H | o | H | o | H |
| Geology & Soils | o | M | o | M | o | M | o | M |
| Groundwater | o | H | o | H | o | H | o | H |
| Streams | o | H | - | H | -- | H | o | H |
| Floodplains | o | H | o | H | o | H | - | H |
| Wetlands | o | M | - | L | -- | H | - | L |
| Vegetation | o | H | o | H | -- | H | o | H |
| Wildlife & Aquatic Resources | o | H | + | H | -- | H | o | H |
| Threatened & Endangered Species | - | M | o | M | o | M | o | M |
| Air Quality | o | H | o | H | o | H | o | H |
| Water Quality | - | H | - | H | -- | H | o | H |
| Noise | o | M | o | M | o | M | o | M |
| Cultural Resources | - | M | - | M | - | M | - | M |
| Utilities & Infrastructure | o | H | o | H | o | L | o | H |
| Transportation | o | H | o | H | o | H | o | H |
| Aesthetics & Visual Resources | o | H | o | H | -- | H | o | H |
| Recreation | - | H | + | H | + | H | + | H |
| Hazardous Substances/Petroleum Products | o | H | o | M | o | M | o | M |
| Socioeconomics | -- | H | + | H | + | H | + | H |
| Environmental Justice | o | H | o | H | o | H | o | H |
| Human Health & Safety | -- | H | ++ | H | ++ | H | ++ | H |
| Sustainability, Greening & Climate Change | o | H | o | H | o | H | o | H |

++ Denotes an expected major long-term environmental or social benefit as a result of measure implementation.
+ Denotes an expected moderate long-term environmental or social benefit as a result of measure implementation.
o Denotes no or minor expected long-term environmental or social benefit or impact as a result of measure implementation.
- Denotes an expected moderate long-term environmental or social impact as a result of measure implementation.
-- Denotes an expected major long-term environmental or social impact as a result of measure implementation.

## 8.1 Land Use

Plan F0: No Action (Not Selected). Minor impacts to land use would be expected without project implementation. Approximately 80 percent of the Blanchard River Watershed is comprised of agricultural lands, with the majority of this consisting of commodity crops such as corn or soybeans. It is expected that this amount will remain relatively consistent, as will most other land use categories, such as forested areas and wetland acreage. It is expected, however, that urbanization will continue to increase in the vicinity of Findlay which may slowly reduce agricultural acreage. Increased urbanization would also lead to more impervious surfaces through the creation of additional roads and parking areas, which may contribute to lower water quality, higher nutrient loads, and increased runoff. Future climate change may also result in changes to agricultural activities, transportation, and infrastructure (Section 8.22).

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Based on data from the National Land Cover Database (NLCD), approximately 532 acres will be converted from their current land use (predominantly agriculture) to levee, diversion channel and permanent easement areas under the current plan (Table 8.1). The implementation of this measure is expected to incur moderate, long-term impacts to land use.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). The construction of this alignment would alter approximately 188 acres within the proposed work area through easement or direct construction (Table 8.1), and the majority of this area consists of cultivated crops. The implementation of this measure is expected to incur minor, long-term impacts to land use.

Plan F2: Blanchard to Lye Cutoff (Selected). This proposed measure is expected to convert approximately 32 acres from their current land use (predominantly agricultural) to levees and permanent easement (Table 8.1). The implementation of this measure is expected to incur minor, long-term impacts to land use.

| Table 8.1. Land Cover Affected by the Proposed Alternatives (NLCD, 2011) | | |
|---|---|---|
| **Land Cover Classification Impacts (in acres)/Measure** | **West Diversion Alignment 2** | **Blanchard to Lye Cutoff** |
| Developed, Open Space[1] | 36.45 | 2.83 |
| Developed, Low Intensity[2] | 2.91 | N/A |
| Developed, Medium Intensity | N/A | N/A |
| Developed, High Intensity | N/A | N/A |
| Deciduous Forest | 12.75 | 5.53 |
| Herbaceous | 6.04 | 9.57 |
| Cultivated Crops | 468.71 | 12.95 |
| Woody Wetlands | 4.7 | 0.13 |
| Emergent Herbaceous Wetlands | 0.89 | 1.08 |
| Total | 532.45 | 32.1 |

1 Includes golf courses, parks and large single family home lots
2 Includes residential areas

## 8.2 Geology and Soils

Construction activities related to implementation of the measures listed below are expected to have minor, short-term impacts to geology and soils, such as temporary increases in erosion. A total of approximately 2.97 million cubic yards (CY) of excavated soil is expected to be placed in an abandoned quarry (see figure 7.1 for quarry location) through the implementation of the recommended plan.

Plan F0: No Action (Not Selected). Impacts to geology and soils within the project area would not be expected under the No Action alternative.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). A diversion channel inlet will be used to divert flow from Eagle Creek into the diversion channel. Approximately 11,900 CY of soil with the proper engineering characteristics would be obtained from the proposed diversion channel excavation and used as fill to construct the diversion structure to the extent practicable. In the case that suitable soil is not fully available from the proposed excavation site, it will be purchased from local stone and supply companies with some minimal impacts to air quality during transportation. The diversion channel construction would involve approximately 2.97 million CY of soil excavation, with approximately 13,600 CY of the excavated material used to construct berms adjacent to the channel. Approximately 10,000 CY of soil would be reused to construct the diversion structure. The remainder of excavated material would then be placed at an abandoned quarry located in Findlay near the airport. Stripped topsoil will be reused as much as possible. Impacts to prime farmlands are expected to be limited to approximately 73 acres (Table 8.2 and Figure 8.2). The earthwork described above is

expected to have minor, short-term impacts on geology and soils that would occur during the construction phase of the project (e.g., erosion). See the Environmental Appendix for further information concerning the Farmland Protection Policy Act, including the completed Farmland Conversion Impact Rating Form.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). Channel construction will involve approximately 1.3 million CY of soil and 1.0 million CY of bedrock excavation. Some of the excavated material will be used to construct berms adjacent to the channel immediately downstream of the diversion structure, but most will be placed at an abandoned quarry located in downtown Findlay near the airport. Topsoil stripped from the channel footprint will be reused in the channel.

A detention structure and upstream diversion channel will be used to divert flow from Eagle Creek into the diversion channel. Approximately 33,000 CY of soil will be excavated and used as fill to construct the diversion structure. Stripped topsoil will be reused. This earthwork is expected to have minor, short-term environmental impacts on geology and soils that would occur during the construction phase of the project.

Plan F2: Blanchard to Lye Cutoff (Selected). Approximately 77,000 CY of borrow material for the Blanchard to Lye cutoff levee would be obtained through the excavation of the diversion channel. Approximately 24,000 CY of topsoil will be stripped from the levee footprint and placed within the abandoned quarry. The earthwork described above is expected to have minor, short-term environmental impacts on geology and soils (e.g., erosion).

Table 8.2. Prime Farmland Soils Impacts (SSURGO, 2014)

| Diversion Channel | |
|---|---|
| Prime Farmland Soil Types | Area |
| All areas are prime farmland | 73.44 |
| Not prime farmland | 2.33 |
| Prime farmland if drained | 237.66 |
| **BLDC Levee** | |
| Prime Soil Types | Area |
| All areas are prime farmland | 5.29 |
| Prime farmland if drained | 10.42 |

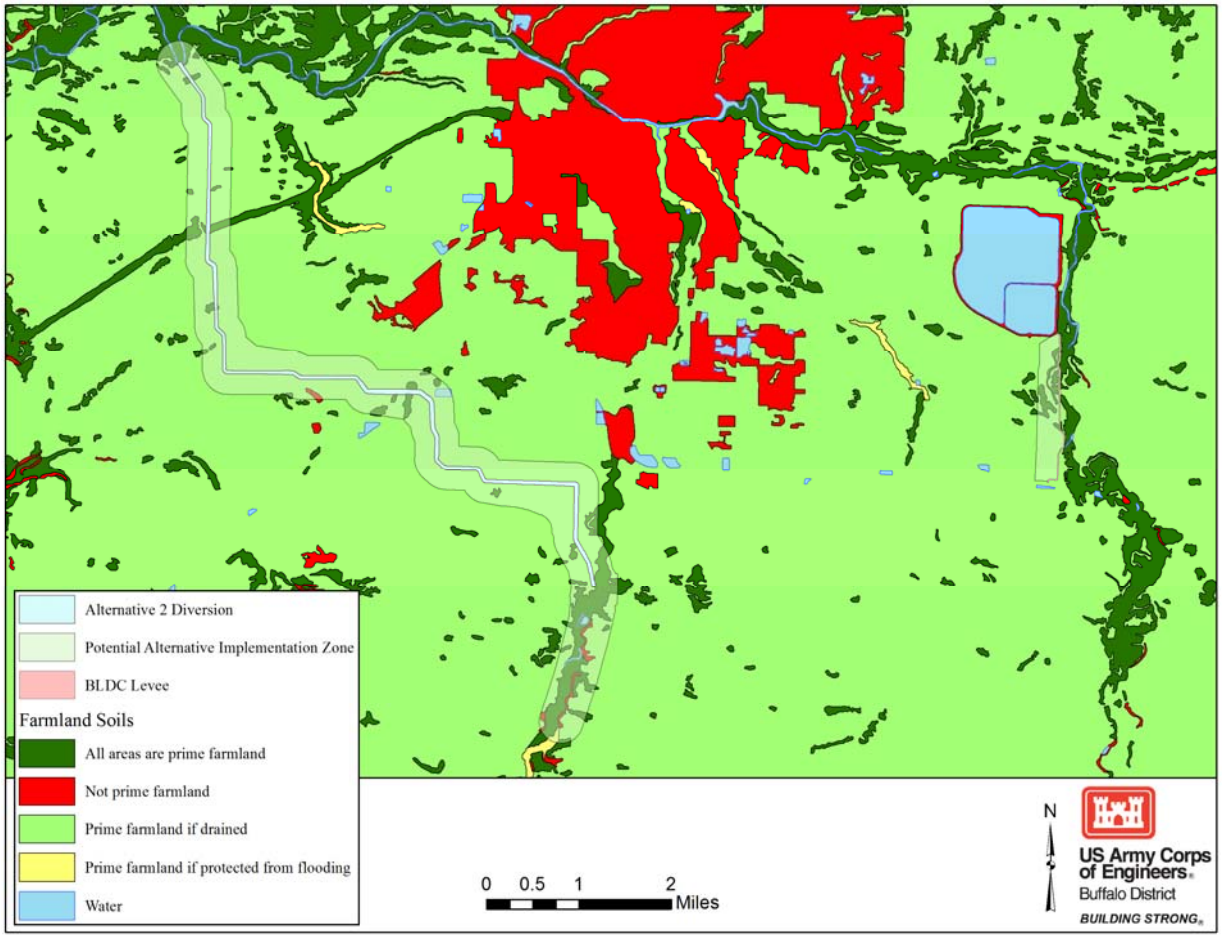


**Figure 8.2. Impacts to Farmland Soils expected within Project Area**

## 8.3 Groundwater

Plan F0: No Action (Not Selected). Impacts to groundwater are not anticipated under the No Action alternative.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). This proposed diversion channel would be approximately 9.4 miles long, with a bottom width of 35 to 47 feet, a minimum depth of 10 to 16 feet, 1V:4H side slopes, and a channel grade of 0.015 to 0.215 percent. A diversion structure and diversion channel inlet would be used to divert flow from Eagle Creek into the diversion channel. It is estimated that the bottom of the channel would be within a couple feet of the existing bedrock surface along the majority of its length, with bedrock exposure likely in some areas.

Where the channel intersects relatively free-draining soils, drainage of perched groundwater within these deposits would be expected. Where the potentiometric surface (level to which water in a groundwater well would naturally rise) of the underlying bedrock aquifer lies above the

bottom of the proposed channel, groundwater will be drawn down to the elevation of the bottom of the channel. The distance away from the channel in which this drawdown will occur will depend on the porosity and permeability of the bedrock aquifer. The zone of influence will depend on the amount of interconnected void spaces in the bedrock.

Construction of this diversion channel would potentially increase groundwater pollution by locally decreasing the depth to groundwater, increasing net recharge, and removing soil from the vadose zone. There is potential for an increase in net recharge of the bedrock aquifer where the potentiometric surface is below the bottom of the diversion channel. Currently, in general, relatively imperious clayey till serves as a hydraulic barrier to shallow groundwater and surface water entering the deeper bedrock aquifer. The diversion channel will likely be excavated down to/ close to the bedrock surface in some locations. Water flowing/standing in the diversion channel could have an easier route (through fractures in the bedrock) down into the bedrock aquifer. Consequently, higher groundwater pollution potential may occur as a result of diversion channel construction, with long-term, minor impacts to groundwater expected (see Environmental Appendix for more information).

A small number of wetlands that may indirectly be impacted as a result of drainage by the adjacent diversion channel due to the coarseness/ porous nature of the soils surrounding the alignment. See section 8.6 for further information concerning indirect wetland impacts due to the implementation of the Alternative 2 Alignment.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). The proposed Aurand Run Diversion Channel is approximately 7.7 miles long, with a bottom width of 40 feet, minimum depth of 15 feet, 1V:3H side slopes, and a bottom slope of 0.07 to 0.14 percent. A diversion structure and upstream diversion channel will be used to divert flow from Eagle Creek into the diversion channel. It is estimated that the bottom of the channel will be below the existing bedrock surface along nearly the entire length.

Where the channel intersects relatively free-draining soils, drainage of perched groundwater within these deposits would be expected. Where the potentiometric surface of the underlying bedrock aquifer lies above the bottom of the proposed channel, groundwater will be drawn down to the elevation of the bottom of the channel. The distance away from the channel in which this drawdown will occur will depend on the porosity and permeability of the bedrock aquifer. The zone of influence will depend on the amount of interconnected void spaces in the bedrock.

Construction of this diversion channel will increase groundwater pollution potential by decreasing the depth to groundwater, increasing net recharge, and removing all of the soil from the vadose zone. This would lead to a higher groundwater pollution potential, which would incur minor impacts over the long-term.

Plan F2: Blanchard to Lye Cutoff (Selected). The predominate hydrogeolgic setting in the proposed Blanchard to Lye Cutoff area consists of alluvium over bedrock. Borrow material used to construct the levee would be obtained by excavating adjacent to the proposed levee. This measure would be expected to incur minor, long-term impacts to groundwater, as excavation may increase the potential for groundwater pollution by decreasing the depth to groundwater, increasing net recharge, removing soil from the vadose zone, and creating topographic areas where surface water will accumulate, which can negatively impact groundwater if contaminants enter these low areas.

## 8.4 Streams

No Action (Not Selected). Impacts to streams are not anticipated under the No Action alternative. Any increased urbanization, however, would lead to more impervious surfaces through the creation of additional roads and parking areas which may contribute to lower water quality, higher nutrient loads, and increased runoff. This could likely result in a change in surface water dynamics over time (e.g., flashier hydrograph). Potential future climate change may also result in changes to surface water conditions over time (Section 8.22).

West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). This measure would result in moderate, long-term impacts to streams as a result of the in-stream diversion structure on Eagle Creek will temporarily back up water in the creek and the crossing of the diversion channel across several small streams within agricultural areas and to an upstream segment of Aurand Run. Only a limited on-site (i.e., road crossings) evaluation of these streams could be performed as a result of a lack of site access. A water control structure would be placed at the intersection with Aurand Run to prevent the dewatering of downstream areas on Aurand Run. Table 8.4a outlines the anticipated linear feet of stream impacts from the diversion channel crossings along with the associated stream types based on the NHD, aerial interpretation, and observations from road crossings. It is assumed that the proposed operation of the diversion structure will not result in impacts downstream of the structure along Eagle Creek to the confluence with the Blanchard River (See Section 6.2 Plan F1 and Appendix A:Section 6.2 for details).

Significant avoidance of stream impacts has been accomplished through the project planning process and associated resource agency coordination, as potential stream impacts were a factor in screening out other measures and alternatives that were considered earlier in the process (e.g., Aurand Run alignment) (Environmental Appendix). As per USFWS, USEPA and ODNR recommendations, best management practices (BMPs) will be incorporated to the extent practicable. These would include conducting in water work only during low flows to minimize sedimentation and the development and implementation of a storm water pollution prevention plan. There are still unavoidable impacts to approximately 307 linear feet of ephemeral streams, 1295 linear feet of intermittent streams, and 3,905 linear feet of perennial streams expected from construction of the recommended plan. The Corps is proposing to enhance at least 9,094.15

linear feet of highly modified stream channels by adding floodplain benches and forested/scrub-shrub/emergent riparian buffer along approximately 1,446 linear feet of Aurand Run and 7,647.74 linear feet of Lye Creek. This will improve habitat within the stream and help to connect woodlots to better serve as a riparian corridor for both aquatic and terrestrial fauna. It would also serve to offset the proposed permanent impacts from the recommended plan and result in no net loss of stream habitat within the Blanchard River Watershed (Mitigation Plan Appendix H). Because of limited site access during the study, however, it is expected that the Mitigation Plan for these stream impacts would not be finalized until sometime after completion of the feasibility study.

Table 8.4a. Stream impacts associated with the Alternative 2 Alignment (NHD, 2014 & aerial interpretation)

| Stream Name | Type | Impact Length (LF) |
|---|---|---|
| Western Alignment (Alt 2 & Aurand Run) – Ephemeral Stream 2 | Ephemeral | 307.11 |
| Western Alignment – Intermittent Stream 5 | Intermittent | 1,294.91 |
| Western Alignment – Perennial Stream 3 | Perennial | 657.78 |
| Aurand Run | Perennial | 653.27 |
| Blanchard River | Perennial | 250.70 |
| Eagle Creek | Perennial | 2343.38 |
| Totals | Ephemeral | 307.11 |
| | Intermittent | 1,294.91 |
| | Perennial | 3,905.12 |
| | Overall | 5,507.14 |

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). Implementation of this measure would incur major, long-term impacts to approximately 35,000 linear feet of Aurand Run and other tributaries. These impacts would result from the straightening and hardening of the natural riparian area along Aurand Run. Approximately 275 linear feet of the Blanchard River would also be impacted due to hardening of banks to protect against increased erosion where the diversion empties into the Blanchard River. Table 8.4b outlines the stream impacts to Aurand Run and its associated tributaries. More information concerning stream impacts associated with the Aurand Run Alignment is available in the Section 404(b)(1) Evaluation presented in the Environmental Appendix.

| Table 8.4b. Stream impacts associated with the Aurand Run Alignment (NHD, 2014) | | |
|---|---|---|
| **Stream Name** | **Type** | **Impact Length (LF)** |
| W-I-6 | Intermittent | 79.11 |
| W-I-1 | Intermittent | 4,244.94 |
| W-I-2 | Intermittent | 118.81 |
| W-I-3 | Intermittent | 286.54 |
| W-P-1 | Perennial | 67.75 |
| W-I-5 | Intermittent | 72.60 |
| Aurand Run | Perennial | 29,265.45 |
| W-P-2 | Perennial | 119.87 |
| W-I-4 | Intermittent | 267.40 |
| Blanchard River | Perennial | 272.71 |
| Eagle Creek | Perennial | 361.43 |
| | | |
| Totals | Intermittent | 5,069.40 |
| | Perennial | 30,087.21 |
| | Overall | 35,156.61 |

Blanchard to Lye Cutoff (Selected). Impacts to streams are not anticipated as a result of implementation of this measure, as the proposed levee will be setback from the Blanchard River and there are no tributary streams in the vicinity.

## 8.5 Floodplains

Plan F0: No Action (Not Selected) The city of Findlay and Hancock County participate in the National Flood Insurance Program and the city and county will continue to acquire structures to evacuate the floodplain as funding is available. These properties will be restricted from further development through the use of deed restrictions. Additionally, the city and county zoning ordinances will guide future development and that any development must be in accordance with established floodplain development ordinances.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected) & Aurand Run Alignment (Not Selected). The impacts to the floodplain are still being quantified; however, there will be a significant reduction in the floodplain along lower Eagle Creek through the implementation of one of the west diversion measures. It is anticipated that flows would increase at the confluence of the diversion and the Blanchard River by approximately 250 cfs, leading to high water levels during high water events downstream of this location. These impacts are expected to be minor, as 250 cfs would comprise approximately two percent of the overall flow and short-term in nature, as the additional flow would be confined to high water events.

Plan F2: Blanchard to Lye Cutoff (Selected). With the Blanchard to Lye Cutoff levee, there will be changes to the overall floodplain. While the actual impacts are still being quantified, they are expected to be moderate and short-term in nature. With this component of the plan, the Blanchard River floodplain that flows through the city of Findlay will be reduced; however, there may still be impacts to the floodplain between the Blanchard River and Lye Creek as well as the potential for induced flooding in the portions of the Blanchard River that flow near the Findlay Reservoir. The floodplain on Lye Creek leading into the city is also expected to be significantly reduced.

An illustration of the change in the 0.01 ACE floodplain with and without project is shown in Figure 8.5. It should be noted that the Recommended Plan floodplain will continue to change as the design process continues. The purpose of the illustration is to depict the magnitude of change in the floodplain as a result of the Recommended Plan and is not meant to depict specific areas of change in the floodplain.

The Recommended Plan is not likely to induce significant development in the base flood plain. The portion of the watershed which will receive the benefit of the project is primarily developed under existing conditions, and little land available for induced growth due to the Recommended Plan. For new development and significant redevelopment, the city and county have flood plain management regulations. Any new construction must demonstrate that they have zero impact on their neighbors or landowners downstream at any flood event. Hancock County is also actively evacuating the floodplain with local, state, and Federal HMGP grants. The lands purchased with the funds have deed restrictions regarding future development. The land from these purchases are used to free the floodplain which will give the Blanchard River a more natural appearance, restore flood plain values, and provide recreation benefits. The city of Findlay and Hancock County also have zoning and land use regulations to further manage growth and prevent further encroachment on the flood plain.

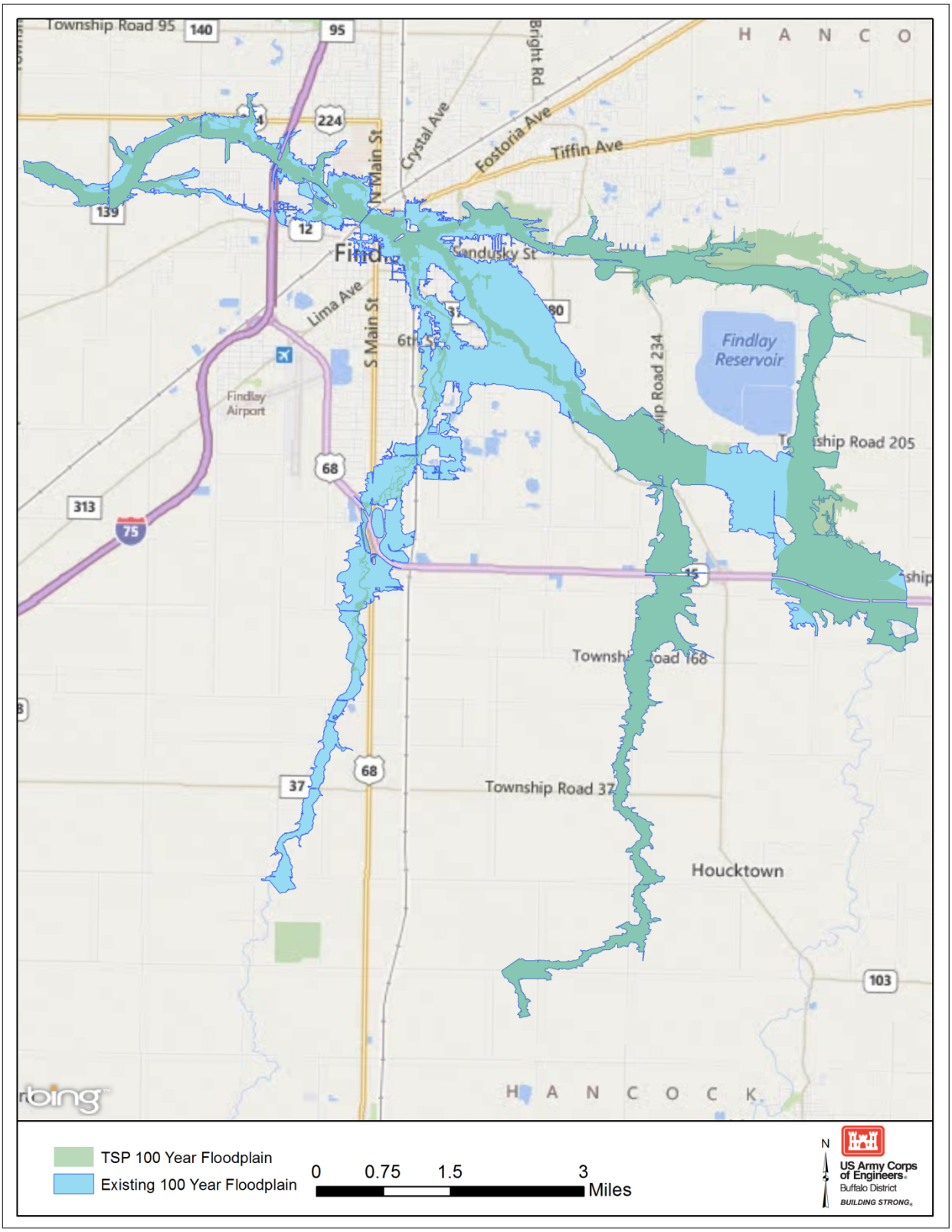


**Figure 8.5 – Depiction of 0.01 ACE Floodplain and Without-Project Floodplain**

## 8.6 Wetlands

A site specific wetland delineation data was not used to assess the existing conditions or anticipated wetland impacts within the study area because of a lack of site access. Therefore, a desktop review of readily available resources (i.e., aerial photos, soil survey, Ohio & National Wetland Inventory mapping, land use mapping, and discussion with resource agencies) was completed to identify as accurately as possible any wetland resources that may be impacted. In order to make a comprehensive database of wetlands in the area, a hybrid of both the NWI and OWI coverages was created using GIS. The datasets were merged in a way to prevent the over calculation of resources and encompass all available data. Table 8.6 provides the estimated type and associated acreage of wetland impacts expected to occur as a result of implementation of the recommended plan. The recommended plan will result in unavoidable direct impacts to 7.09 acres of freshwater wetlands and indirect impacts to 4.50 acres of freshwater wetlands. These impact calculations assume that all wooded areas with hydric soils are wetlands, which is expected to be an overestimation based on previous work conducted in adjacent areas. Thus, once field surveys are conducted in the future it is expected that the total amount of wetlands currently assumed to be within the project area will go down and thus direct impacts will go down.

It is currently expected that the in-stream diversion structure on Eagle Creek will temporarily back up water in the creek which may result in a conversion of adjacent forested wetlands upstream over a long period of time to either scrub-shrub or emergent wetlands. During this same period of time, however, it is possible that new wetland areas may be created or existing wetlands enhanced within the flood zone due to the periodic increased hydrology. A very conservative estimate of impacts is currently being assumed during the feasibility study which considers that all wetlands that fall within the 100-year ponding area will be indirectly impacted. This is a conscious overestimation of impacts and, as more detailed design and modeling analysis of this structure is conducted, a more refined estimate of ponding frequency and duration will be available to determine the likely extent of impacts. One additional note is that any increase in flooding frequency and duration will increase the amount of forested riparian wetlands adjacent to the current wetlands. Any impacted forested wetlands will just have a different cover type (e.g., scrub-shrub or emergent hydrophytic vegetation). Thus the area upstream of the diversion structure will result in no net loss or possibly a net increase in riparian wetlands upstream of the diversion structure. It is assumed that the proposed operation of the diversion structure will not result in impacts to wetlands downstream of the structure along Eagle Creek to the confluence with the Blanchard River (See Section 6.2 Plan F1 and Appendix A:Section 6.2 for details).

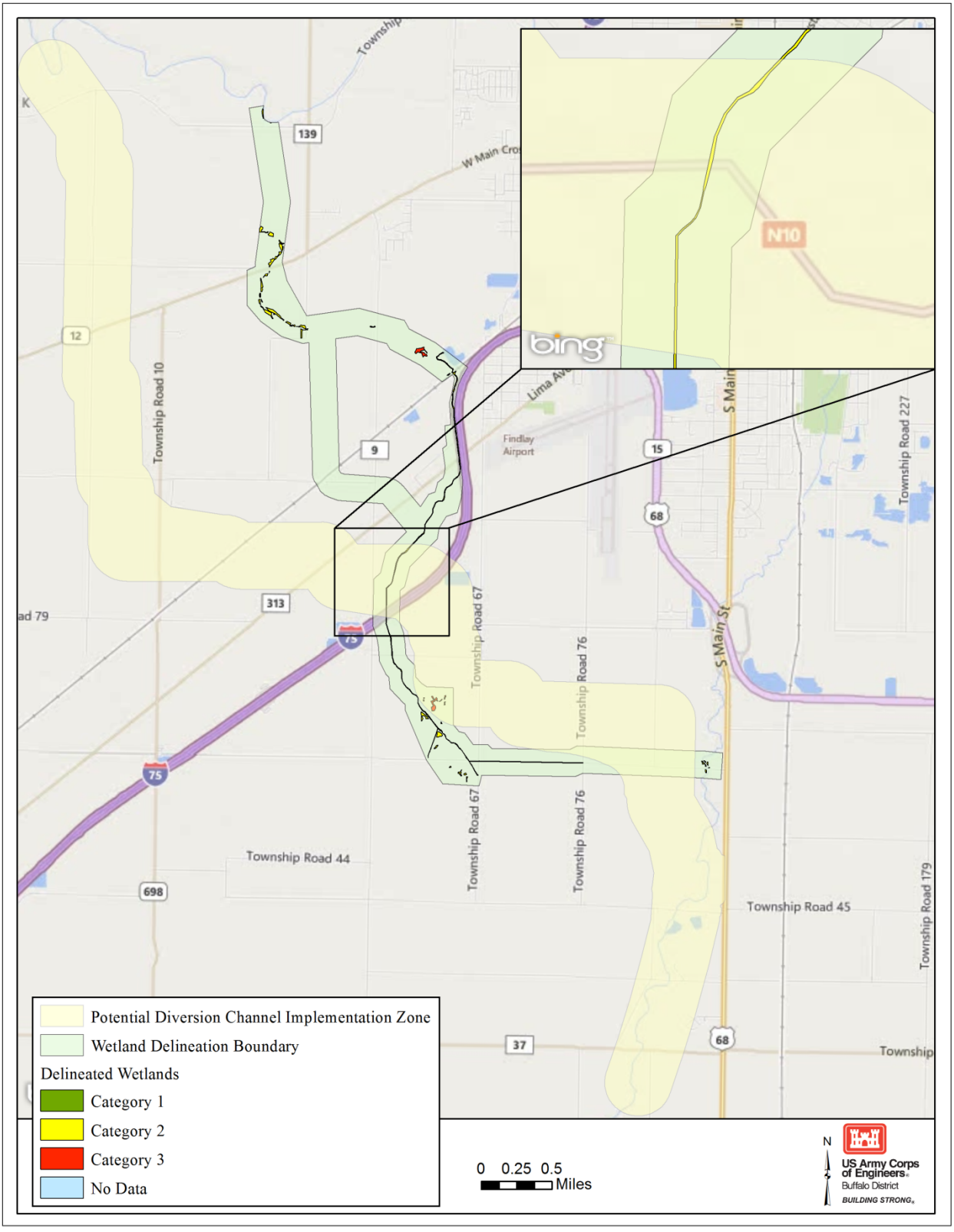


**Figure 8.6a. Potential Diversion Channel implementation zone relative to Wetland Delineations conducted within the project area.**

| Table 8.6. Project Measures and associated impacts to wetlands (NWI and OWI) | | |
|---|---|---|
| **Alternative** | **Impact** | **Area in Acres** |
| Alternative 2 Alignment | Direct | 6.28 |
| Alternative 2 Alignment | Indirect | 4.50 |
| Aurand Run Alignment | Direct | 106.29 |
| Aurand Run Alignment | Indirect | 21.54 |
| Blanchard to Lye Cutoff | Direct | 0.81 |
| Blanchard to Lye Cutoff | Indirect | 0.0 |

Significant avoidance of wetland impacts has been accomplished through the project planning process since potential wetland impacts were a factor in screening out other measures and alternatives considered earlier in the process (see Section 404(b)(1)) evaluation in the Environmental Appendix). As per USFWS, USEPA and ODNR recommendations, BMPs will be incorporated to the extent practicable. These would include conducting in water work only during low flows to minimize sedimentation and the development and implementation of a storm water pollution prevention plan. There are still approximately 11.6 acres of unavoidable impacts to freshwater wetlands that are expected during construction of the recommended plan (direct and indirect impacts combined).

The Corps is proposing to restore at least 23.2 acres of forested/scrub-shrub wetlands (2:1 mitigation ratio) adjacent to the Blanchard River as compensatory mitigation to offset the unavoidable impacts to freshwater wetlands and ensure that there are no net loss of the functions and values of these special aquatic sites (see Mitigation Plan Appendix H for further information). The appropriate Real Estate interest (e.g., easement, fee, etc) for lands where mitigation is proposed will be acquired by the non-federal sponsor to support the construction, operation and maintenance of the project. Generally, fish and wildlife mitigation lands, ecosystem restoration, and other environmental purposes require fee ownership however, a lesser easement interest may be appropriate based on the extent of interest required for the operation or other requirements of a project. The USACE will use the "Guidelines for Wetland Mitigation Banking in Ohio" to develop habitat restoration planting plans, success criteria, and monitoring protocols. Remedial actions would also be developed and implemented if/when habitat restoration areas do not achieve success criteria. Because of limited site access during the study, however, it is expected that the Mitigation Plan for these wetland impacts would not be finalized until sometime after completion of the feasibility study.

No Action (Not Selected). Significant impacts to wetlands are not anticipated under this alternative.

West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Implementation of this

measure would likely result in moderate, long-term impacts to approximately 6.3 acres of wetlands, with another 4.5 acres potentially incurring indirect long-term impacts. The majority of this 4.5 acres of potential impact would be as a result of a possible increase in flood frequency and duration as a result of water being retained behind the diversion structure in Eagle Creek during storms larger than the five year event. This may result in a change in cover type in these forested wetlands to scrub-shrub or emergent. This may, however, increase wetlands adjacent to these riparian areas and result in a net increase in wetland.

There are several wetlands that may indirectly be impacted as a result of drainage by the adjacent diversion channel due to the coarseness/ porous nature of the soils surrounding the alignment. Efforts to further minimize direct and indirect impacts to wetlands through the implementation of this measure will continue, which would mainly include avoidance of wetlands while finalizing the alignment of the diversion channel to the extent practicable. Areas of standing water may accumulate in the bottom of the diversion channel especially over areas of bedrock, as remnants from past flows, rainfall events, and/or from where the channel may intercept sub-surface water. These areas may result in the formation of some wetland conditions if wet for sufficient durations (Figure 8.6b).

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). Based on available data, the Aurand run alignment is expected to result in major direct and indirect impacts to wetlands over the long-term. The direct impacts would total approximately 106 acres of wetlands. An additional roughly 21 acres of indirect impacts are also expected as a result of the drainage caused by the diversion channel within the course textured soils surrounding the alignment. More information concerning stream impacts associated with the Aurand Run Alignment is available in a wetland delineation (not enclosed) and Section 404(b)(1) evaluation in the Environmental Appendix

Blanchard to Lye Cutoff (Selected). This cutoff and its associated structures are expected to result in moderate, long-term impacts of approximately 0.8 acres of wetland (Figure 8.6c).

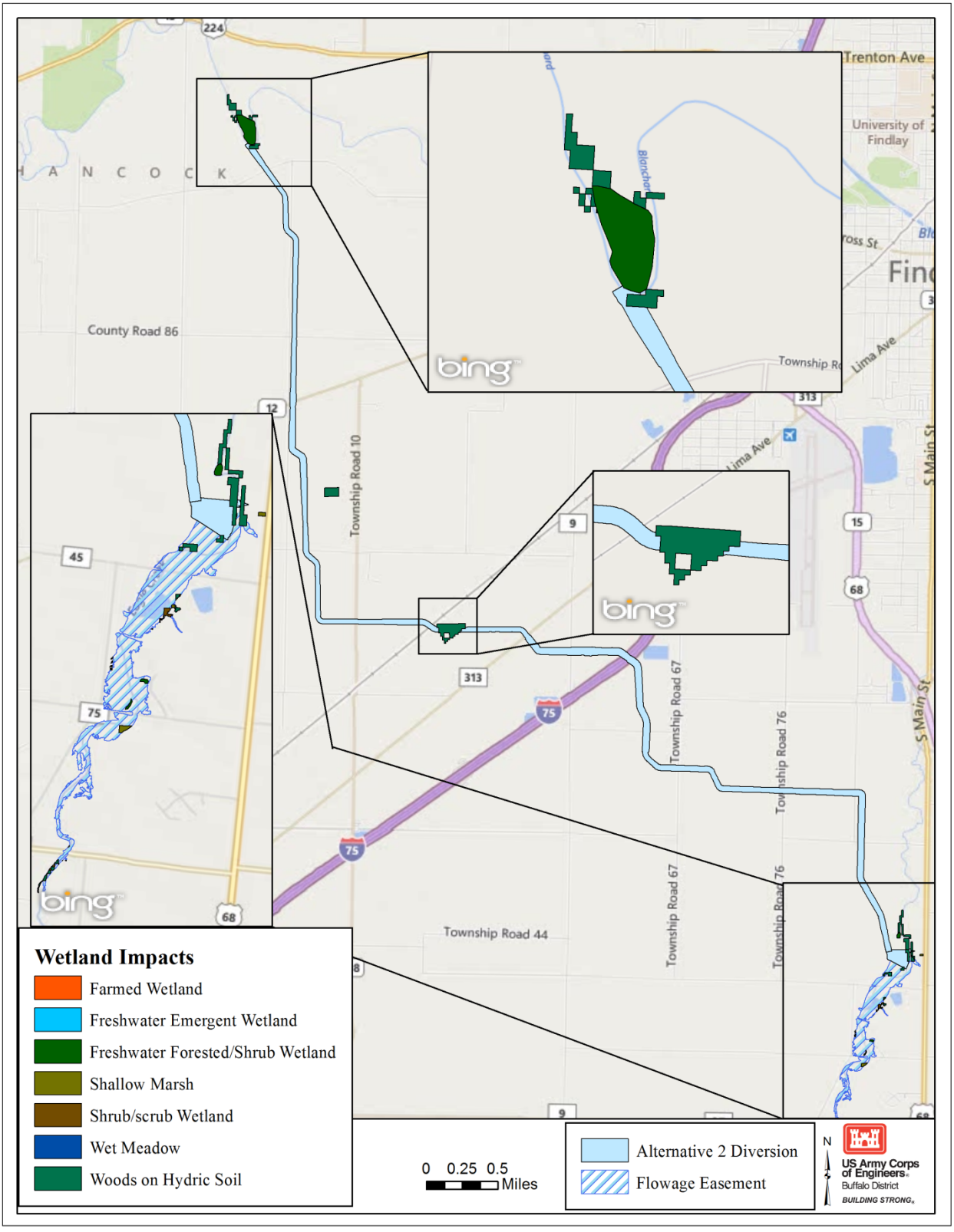


**Figure 8.6b. Direct and indirect impacts expected through the implementation of the Alternative 2 Alignment**

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). Based on available data, the Aurand run alignment is expected to result in major direct and indirect impacts to wetlands over the long-term. The direct impacts would total approximately 106 acres of wetlands. An additional roughly 21 acres of indirect impacts are also expected as a result of the drainage caused by the diversion channel within the course textured soils surrounding the alignment. More information concerning stream impacts associated with the Aurand Run Alignment is available in a wetland delineation (not enclosed) and Section 404(b)(1) evaluation in the Environmental Appendix

Plan F2: Blanchard to Lye Cutoff (Selected). This cutoff and its associated structures are expected to result in moderate, long-term impacts of approximately 0.8 acres of wetland (Figure 8.6c).

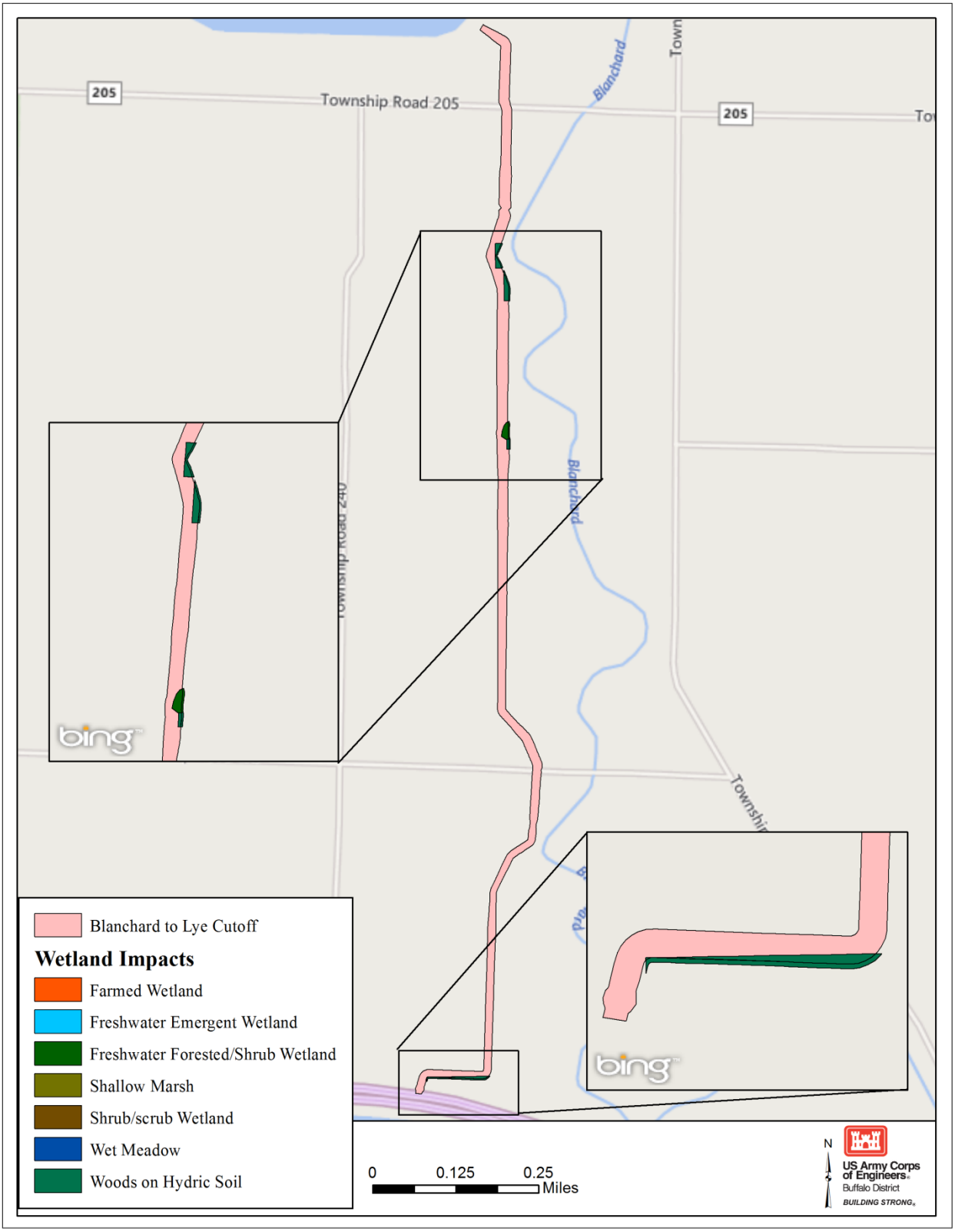


**Figure 8.6c. Direct and indirect impacts expected through the implementation of the Blanchard to Lye Cutoff**

## 8.7 Vegetation

Plan F0: No Action (Not Selected). Impacts to vegetation are not anticipated as a result of the implementation of this alternative.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Implementation of the Alternative 2 Alignment is expected to incur minor, long-term impacts to vegetation in the area. This measure would eliminate croplands, wetlands, and some riparian habitat that exists within and immediately adjacent to the channel. As per USFWS and ODNR's recommendations, tree clearing would be avoided to the extent possible between April 1 and September 30 to avoid potential impacts to listed bat species (further discussed in Section 8.9). It is expected that replanting of the riparian area will target native herbaceous plant communities characteristic of those typically found in the Blanchard Watershed. These plant communities will be maintained while still providing access to the diversion channel in accordance with the Army Corps of Engineers management guidelines (US Army Corps of Engineers, ETL No. 1110-2-571).

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). This measure is expected to incur major, long-term impacts to vegetation in the area. The implementation of this alignment would include impacts to approximately 53 acres of forested habitat and 24 acres of woods on hydric soils (see Table 8.8 in the subsequent section). According to the NWI and OWI data, the wetland impacts associated with this alignment would include approximately 106 acres of direct impacts (12.98 acres of emergent; 0.08 acre of scrub shrub; and 93.23 acres of forested) and 22 acres of indirect impacts (0.99 acre of emergent and 20.55 acre of forested; see Table 8.6 in the previous section). The natural riparian buffer along Aurand Run would be impacted during construction. It is expected that replanting of the riparian area would consist of native grasses that would be maintained to provide access to the diversion measure. As discussed under the Alternative 2 alignment, tree clearing would be avoided to the extent possible between April 1 and September 30 to avoid potential impacts to listed bat species (further discussed in Section 5.9). It is expected that replanting of the riparian area will consist of native herbaceous plants that will be maintained while still providing access to the diversion channel in accordance with the Army Corps of Engineers management guidelines (US Army Corps of Engineers, ETL No. 1110-2-571). Wherever feasible, however, environmentally sustainable design features may be incorporated into this measure (e.g., native habitat plantings).

Plan F2: Blanchard to Lye Cutoff (Selected). Vegetation in this part of the project area would be converted from areas of commodity crops (corn and soybeans) and riparian habitat into areas with managed native species. The current vegetation would be permanently altered due to maintenance and easements. The impacts associated with this measure are expected to be minor and occur over the long-term. While no impacts to forested areas are expected through the implementation of this measure, impacts that may arise will be minimized to the extent practicable and, if at all possible, conducted outside of the active bat season outlined under the

Alternative 2 Alignment section for vegetation impacts. Similar to the Alternative 2 measure above, environmentally sustainable design features will be incorporated into this measure to the extent practicable (e.g., native habitat plantings).

## 8.8 Wildlife and Aquatic Resources

It is expected that any measure involving the use of heavy equipment for construction would lead to some level of disturbance to local wildlife species. These impacts, however, are expected to be short-term and will be avoided through BMPs including tree cutting outside of bat activities seasons as well as mitigated through the installation of exclusion fencing to deter amphibians, reptiles and small mammals from entering construction areas. Table 8.8 summarizes the impacts expected to occur to the four major wildlife habitat types within the Project Area. Percent impacts to wildlife habitat are also provided in Table 8.8 in order to provide insight into the impacts to wildlife habitat the proposed measures are expected to have based on available habitat in the watershed.

| Table 8.8. Permanent and Temporary Impacts expected to Wildlife Habitat through Project Implementation (NHD, NASS, NWI, OWI, NAIP) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Category** | **Area/Length Of Feature within the Watershed** | **West Diversion Alignment 2** | **Percent Impact of Measure on Habitat type[1]** | **Blanchard to Lye Cutoff** | **Percent Impact of Measure on Habitat type[1]** | **Aurand Run Alignment** | **Percent Impact of Measure on Habitat type[1]** |
| Stream Habitat (LF) | 1,255,619 | 5,500 | 0.43% | - | - | 35,000 | 2.79% |
| Grassland Habitat (Acres) | 12,858 | 2.18 (2.67) | 0.038% | 2.47 (0.37) | 0.022% | 0.67 (N/A) | 0.005% |
| Wetland Habitat (Acres) | 6,558 | 1.07 (N/A) | 0.016% | 0.16 (N/A) | 0.002% | 8.23 (N/A) | 0.125% |
| Forest Habitat (Acres) | 27,710 | 11.82 (0.96) | 0.046% | 0.39 (3.45) | 0.014% | 53.08 (N/A) | 0.192% |
| Woods on hydric soils (Acres) | 9,311 | 11.13 (N/A) | 0.120% | 0.65 (N/A) | 0.007% | 23.94 (N/A) | 0.257% |
| Total acres or percent of cover type (does not include stream habitat) | 56,437 | 26.20 (3.63) | 0.053% | 3.67 (3.82) | 0.013% | 85.92 | 0.152% |

1 Includes both direct and indirect impacts
2 Temporary Impacts noted in parenthesis

Plan F0: No Action (Not Selected). Impacts to wildlife and aquatic resources that are not already occurring on a periodic basis (e.g., bank erosion, scouring) are not anticipated to occur as a result of this alternative. However, there is some potential that such impacts could increase over time (see Section 8.22).

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Based on geospatial data from the NHD, NASS, NWI, OWI and the National Agricultural Imagery Program (NAIP), some long-term impacts to wildlife habitat would be expected under the Alternative 2 Alignment. These impacts are expected to be minor relative to the available habitat within the watershed (approximately 0.07%; Table 8.8). The newly created channel would provide some riparian area where none currently exists through the creation of new, albeit seasonal, habitat for riparian species in and along the diversion channel. Species that may benefit include various species of bats, birds, turtles, amphibians and invertebrates. It is not expected, however, that the newly planted riparian vegetation along the channel would provide any shading or significant ecological structure to the channel corridor because of engineering and maintenance constraints. Accordingly, riparian species occurring within the project area may see minor to moderate, long-term benefits to riparian habitat as this habitat may expand through the new diversion channel and water levels, erosion and scouring would be expected to decrease during flood events on portions of the Blanchard River and lower Eagle and Lye Creeks in and around the city of Findlay. Some areas of standing water may accumulate in the bottom of the diversion channel especially over areas of bedrock , as remnants from past flows, rainfall events, and/or from where the channel may intercept sub-surface water. These areas may provide ephemeral aquatic habitat for some invertebrates and avifauna. Construction activities would be limited to periods outside the fish spawning season (from March 1 to June 15) to the extent practicable to adhere to 2014 F&WCAR recommendations from the USFWS and the ODNR.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). Major long-term impacts would be expected as a result of this measure. Approximately 35,000 linear feet of stream presently categorized as Warmwater Habitat by the OEPA would be permanently impacted through the implementation of the Aurand Run Alignment. These impacts would include approximately 18,000 linear feet of forested stream corridor. Terrestrial and flying animal species including bats, birds, invertebrates, reptiles and amphibians would be impacted as suitable habitat for these species would be permanently removed. Aquatic resources such as invertebrates, fish and amphibians would also be negatively impacted by implementation of this alternative. Some riparian and aquatic habitat may be replaced through construction of the new diversion channel, however, the value and amount of such habitat is expected to be relatively low compared to existing conditions. Riparian species occurring within the overall project area, however, may see some benefit from minor reductions in erosion and scouring that would be expected during flood events on portions of the Blanchard River and lower Eagle and Lye Creeks in and around the city of Findlay. Construction activities would be limited to periods outside the fish spawning season (from March 1 to June 15) to the extent practicable to adhere to 2014 F&WCAR recommendations from the USFWS and the ODNR.

Plan F2: Blanchard to Lye Cutoff (Selected). The construction of the cutoff levee is expected to impact habitat for some grassland, wetland and forested species, potentially including birds, bats, turtles, amphibians and invertebrates. These impacts are expected to be both long- and short-term, although minor, relative to the available habitat within the watershed (<0.01% impacts based on available habitat within the watershed; Table 8.8).

## 8.9 Threatened and Endangered Species

Coordination concerning federal- and state-listed species with the USFWS and the ODNR Division of Wildlife (DOW) was initiated with the release of the scoping document in June 2009. Since this time, meetings and discussions with the USFWS and the ODNR have occurred five times over the past five years (see Section 10.2 for greater detail concerning agency meetings). Project progress was discussed and recommendations as well as regulatory compliance information were provided by the agencies. A 2009 planning aid letter from the USFWS outlines project recommendations, including conducing a comprehensive mussel survey, Indiana bat habitat assessment, avoidance of impacts to streams, wetlands and riparian buffers as well as protecting the floodplain from fill material. Further recommendations from the USFWS and ODNR concerning listed species can be found in the F&WCAR.

As per USFWS, USEPA and ODNR recommendations, any effort to minimize impacts to federal- or state-listed mussel species as a result of this project will include employment of future mussel surveys and possible relocations, if and where appropriate. Consultation with the USFWS Ohio Field Office and the ODNR will continue to avoid/minimize impacts to any federally- and/or state-listed species. Tree clearing of areas that are valuable to federally-listed bat species would be done outside of the active bat season (which occurs between April 1 and

September 30), per recommendations provided by the USFWS and ODNR in the 2014 F&WCAR. If tree clearing of such areas cannot be completed during the appropriate season, bat surveys would be completed in advance of clearing operations along with coordination with the USFWS Ohio Field Office. Active bald eagle nest locations were provided by the USFWS in August 2014, as the Service recommends no construction activities occur within 200 meters of bald eagle nests. None of the five confirmed or three unconfirmed bald eagle nests occur within a half mile of the proposed project measures. Impacts to nesting bald eagles are therefore not expected.

Plan F0: No Action (Not Selected). It is expected that no impact would occur to Indiana bat habitat, northern long-eared bat habitat or bald eagle nesting sites if no project were to be implemented. Any potential mussel beds (areas not yet surveyed) may be disrupted or lost as a result of continued flood events within the Blanchard River, which would likely lead to moderate, long-term impacts to the federally endangered clubshell or the rayed bean, if their populations persist in the affected areas within the Blanchard River.

Impacts to state-listed mussels would be expected under the No Action alternative for the same reason outlined for federally-listed species above. No impacts to nesting bald eagles, the Indiana bat, or the rock elm are expected under the No Action alternative.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). No long-term impacts to federally threatened or endangered species are expected as a result of this measure. Some riparian corridor foraging habitat may be created for the Indiana and northern long-eared bats by the diversion channel, although any water flow through the channel would be ephemeral and therefore of limited value to foraging bat species.

According to the ODNR Natural Heritage Database, three state-listed mussels may occur within the vicinity of the confluence of the Blanchard River with the proposed diversion channel downstream of Findlay (see F&WCAR in the Environmental Appendix). Species that may be impacted include the elktoe, salamander mussel, and deertoe. Mussel surveys have been recommended by the USFWS and the ODNR in the 2014 F&WCAR as well as by the USEPA in their 2013 scoping letter, and will be performed during the design phase of the project. If mussel surveys conclude that individuals of these species persist in the immediate vicinity of the proposed measure, efforts will be made, if necessary, to mitigate for impacts to the affected mussel species by incorporating BMPs and possibly relocations to the extent practicable. No state-listed mussels were detected during 2009 surveys in Eagle Creek (Hoggarth and Burgess, 2009) or outlined in information provided by the ODNR in the F&WCAR.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). No long-term impacts to federally threatened or endangered species are expected through the implementation of this measure. While a large amount of relatively high quality stream and wildlife habitat would be permanently impacted as a result of this measure, no federally-listed species would be expected

to be impacted.

Plan F2: Blanchard to Lye Cutoff (Selected). Based on available resource information, no impacts to federal or state threatened or endangered species are expected as a result of the implementation of this measure.

## 8.10 Air Quality

Construction activities have the potential to generate a substantial amount of air pollutants and these emissions can contribute to the overall inventory of pollutants in the atmosphere. Even though these emissions are temporary in nature, the increased pollution load can in some locations exceed NAAQS and/or expose nearby sensitive receptors to substantial pollutant concentrations.

The proposed construction activities would generate air pollutant emissions as a result of excavation, demolition, grading, compacting, trenching, and construction operations; however, these emissions would be temporary and are not expected to generate any offsite effects or exceed state or federal air quality standards within the affected area. The construction of the proposed project would result in short-term emissions of criteria pollutants as combustion products resulting from construction and transportation equipment, as well as evaporative emissions from asphalt paving operations. It is expected that approximately 2.97 million CY of excavated material, which would equate to approximately 183,000 truck loads, would need to be transported offsite. The quarry in which this excavated material will be placed ranges between 10 and 12 miles from the proposed excavation locations. It is not expected that the transport of excavated material will significantly impact air quality, as vehicles are not expected to be idling during transport activities. Project construction would also result in minor short-term increases in emissions from personal and commuter vehicles used to transport construction workers to and from the site as well as a result of short-term detours required by bridge removal, installation and modification.

Construction activities would generate particulate matter emissions as fugitive dust from ground-disturbing activities. Fugitive dust emissions would be greatest during initial site preparation activities and could vary daily depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site are generally proportional to the area of land being worked and the level of construction activity. Appropriate fugitive dust control measures would be employed during construction activities to suppress emissions (i.e., using mulch, water sprinkling, temporary enclosures, and other appropriate methods as needed).

Construction of the recommended plan is expected to generate emissions below *de minimis* levels. Specifications for the construction of this project will stipulate that all diesel equipment meet the USEPA's rules for heavy-duty diesel engines (40 CFR 1068) and implement appropriate options to reduce diesel emissions (e.g., the use of diesel particulate filters or diesel

oxidation catalysts, implementation of idling reduction measures). Hancock County is classified as an attainment area for all criteria pollutants, therefore General Conformity Rule requirements are not applicable. USACE would direct the eventual construction contractor to use low GHG-emitting vehicles to the extent possible and available (e.g., clean diesel technologies).

The direct emissions discussed above include all air pollution resulting from the initial construction of the recommended plan. Indirect emissions associated with this project would include all emissions that would result from maintaining the functionality of the project; including its periodic inspections, operation and maintenance (e.g., control structure operations, mowing and vegetation removal along channels and embankments, needed structural repairs, and adaptive management measures for wetland mitigation areas). These activities would be carried out by the non-Federal project sponsor (i.e. Hancock County).

Plan F0: No Action (Not Selected). No direct impacts to air quality are expected under this alternative, as no additional air emission sources are anticipated within the study area. However, local actions required to respond to periodic flooding (e.g., evacuations, debris clean-up, etc.) would require continued operation of various equipment including emergency response vehicles, front-end loaders, dump trucks, and personal vehicles. The operation of portable pumps would also continue to add pollutants to the local atmosphere.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment & Aurand Run Alignment, and Blanchard to Lye Cutoff (Selected, with the exception of the Aurand Run Alignment). Construction and future maintenance operations of the proposed diversion channel would result in a minor, short-term impact on local air quality. Vehicle emissions from heavy-duty construction equipment (i.e., trenchers, excavators, dump trucks, cranes, graders, rollers, and cement mixers) would contribute carbon monoxide, nitrogen oxides and particulate matter to the local atmosphere. No violations of federal or state air quality standards are anticipated.

## 8.11 Water Quality

Plan F0: No Action (Not Selected). No new impacts to water quality are expected under the No Action alternative. It is, however, expected that water quality would continue to be subject to moderate, long-term impacts as flooding events, leading to erosion and scouring, would continue to occur within the project area.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Some increase to in-stream turbidity would be expected during and immediately following construction activities as a result of measure implementation. This increase is expected to be moderate and short-term in nature and soon reach pre-project levels with completion of any re-vegetation operations and slope stabilization, where applicable. Every effort will be made to minimize all stream and wetland fill and avoid in water work between March 1 and June 15 (to minimize impacts to fish spawning), as per recommendations provided by the USEPA scoping response letter in 2013 and the F&WCAR provided by the USFWS and ODNR in 2014.

Due to the rerouting of floodwaters from Eagle Creek during higher flow events, the water within the diversion channel would be temporarily exposed to more sunlight, which is expected to raise water temperatures, depending on the time of year. Any increase in temperature would, however, be for short durations during the limited amount of time that flows are routed through the channel. Overall, any impact in this regard is considered negligible. High flow events necessitating use of the diversion channel would be less likely during the warmer summer months when temperature impacts could be more severe. Some areas of standing water may accumulate in the bottom of the diversion channel especially over areas of bedrock, as remnants from past flows, rainfall events, and/or from where the channel may intercept sub-surface water. During diversion operations, flows less than the two year flow level would be allowed to continue down Eagle Creek through downtown Findlay, thus maintaining the aquatic ecosystem during diversion operations.

Direct nutrient runoff to the Blanchard River may increase slightly with this diversion due to the fact that it would receive drainage directly from agricultural fields (i.e., tile drainage tied directly to the diversion channel). These increases would occur over the short-term, when water is diverted during high water events and is expected to be minor in nature compared to existing conditions (i.e., network of drainage ditches). A storm water pollution prevention plan will be developed and implemented in association with this measure, as per USFWS recommendations in the 2014 F&WCAR).

An application for Clean Water Action Section 401 water quality certification would be submitted to OEPA in a future project phase for anticipated impacts to streams and wetlands resulting from the discharge of fill material in these waterways as a result of this project.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). This measure would lead to major, long-term and adverse impacts to water quality in Aurand Run. Approximately 35,000 linear feet of stream presently categorized as Warmwater Habitat by the OEPA would be permanently impacted through the implementation of this measure. These impacts would include increases in turbidity, erosion and scouring during construction and high water events, which would lead to increased sedimentation over the long-term. Dissolved oxygen levels would also be expected to drop over the long-term as a result of increased temperatures following the loss of the existing forested buffer due to construction and the need to keep trees away from the new channel in order to prevent flow obstruction. Every effort will be made to minimize all stream and wetland fill and avoid in water work between March 1 and June 15 (to minimize impacts to fish), as per recommendations provided by the USEPA scoping response letter in 2013 and the F&WCAR provided by the USFWS and ODNR in 2014. That portion of Aurand Run north of the quarry and that runs through the Oakwoods Nature Preserve receives much of its flow from water pumped out of the quarry, and it is therefore a relatively cold water aquatic habitat.

Direct nutrient runoff to the Blanchard River may increase slightly with this diversion due to the

fact that it would receive drainage directly from agricultural fields (i.e., tile drainage directly to diversion channel). These increases would occur over the short-term, when water is diverted during high water events and is expected to be minor in nature compared to existing conditions (i.e., network of drainage ditches).

Plan F2: Blanchard to Lye Cutoff (Selected). No in-water work is proposed with this measure. It is therefore unlikely that this alternative would adversely affect water quality within the project area. Applicable BMPs would be prescribed and applicable stormwater management requirements would be followed. The BMPs likely to be used to prevent or reduce turbidity would consist of siltation barriers and/or hay bales to prevent overland flow of sediment into nearby waterways. There is also a possibility that this measure would lead to higher nutrient levels if the forested riparian buffers along the Blanchard River are disturbed. However, the potential alignments of this measure are mostly all far enough away from this buffer such that this wouldn't be realized. Every effort will be made to minimize all stream and wetland fill, as per recommendations provided by the USEPA scoping response letter in 2013 and the F&WCAR provided by the USFWS in 2014.

## 8.12 Noise

The recommended plan would temporarily increase noise in the immediate project area over the normal existing industrial and agricultural activities and vehicular traffic noise levels due to the operation of construction and transportation equipment. Generally, energy-equivalent noise levels at public works construction sites range from 75 to 89 dBA (A-weighted decibels). The single vehicle noise output of earth-moving equipment similar to that which would be used to construct the project would range from 72 to 96 dBA (the peak noise level of a loud motorcycle at 20 feet is 110 dBA) (Canter, 1996). For the purposes of this evaluation, adjacent land uses have been used to estimate noise levels and the potential impact on ambient conditions at the project site. Much of the land uses adjacent to the site include vacant land and agricultural fields, which lack sensitive noise receptors (e.g., schools, hospitals). Residential areas within Findlay or more isolated residences outside of Findlay would be the most susceptible to adverse noise impacts. To minimize any adverse impacts on both residents and construction workers, the eventual construction contractor would be required to use methods and devices to control noise emitted by their equipment.

Plan F0: No Action (Not Selected). If no federal action is taken to address flood risk management needs in Findlay, no additional noise sources are anticipated within the study area. However, minor, short-term noise impacts would occur as part of local actions to respond to periodic flooding (e.g., evacuations, debris clean-up, etc.). These actions would require continued operation of various vehicles including emergency response vehicles, front-end loaders, dump trucks, and personal vehicles. The operation of portable pumps would also incur minor, short-term increases to noise levels in the project area.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected) & Aurand Run Alignment (Not Selected). The construction of the proposed diversion channel would result in minor, short-term noise level impacts. The operation of heavy-duty construction equipment (i.e., trenchers, excavators, dump trucks, cranes, graders, rollers, and cement mixers) would temporarily add mobile noise sources to the project area. No violations of local noise ordinances are anticipated.

Plan F2: Blanchard to Lye Cutoff (Selected). The construction of the proposed diversion levee would result in minor, short-term noise level impacts. The operation of heavy-duty construction equipment (i.e., trenchers, excavators, dump trucks, cranes, graders, and rollers) would temporarily add mobile noise sources to the project area. No violations of local noise ordinances are anticipated.

## 8.13 Cultural Resources

The National Historic Preservation Act of 1966 (NHPA [16 U.S.C. 470 et seq.]) defines historic properties as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. The term includes artifacts, records, and remains that are located within such properties. The term also includes properties of traditional religious and cultural importance to an Indian nation that meet NRHP criteria. Under Section 106 of the NHPA, federal agencies, with direct or indirect jurisdiction over proposed federal or federally assisted undertakings, take into account effects on historic properties. In consultation with the Ohio SHPO, Indian nations and other interested parties, the federal agency makes a determination of significance of potentially affected historic properties and a determination of effect. A determination of adverse effect may require further studies, the development of a mitigation plan, and data recovery or architectural recordation.

Archaeological and architectural investigations have been completed for a portion of the study area's APE. However, due to the lack of access for some areas, additional investigations will be required before historic properties can be fully identified and evaluated and a determination of potential adverse effects can be made. To define these remaining survey requirements, a PA will be negotiated with the Ohio SHPO and other consulting parties to address USACE'S Section 106 review responsibilities for this project. A preliminary draft PA is included in the Environmental Appendix.

Plan F0: No Action (Not Selected). It is expected that the Blanchard River will continue to negatively impact any archaeological resources (if present) adjacent to the waterways within the watershed as a result of higher stream velocities, bank erosion and excessive scouring associated with flooding events moderately over the long-term. Historic structures may also be damaged or destroyed as a result of continued flood events within the Blanchard River, if located in the affected areas within the Blanchard River Watershed. Such continued impacts would be considered adverse as archaeological sites and structures were lost.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected) & Aurand Run (Not Selected). The proposed channel construction would require extensive excavation, which could possibly lead to moderate impacts over the long-term. Some of the excavated material will be used to construct berms adjacent to the channel, some will be used to construct the diversion structure, and the remainder will be placed at a quarry located in downtown Findlay near the airport. The areas within which these excavation, construction and disposal areas would occur have not yet been examined for cultural resources, as rights-of-entry have not yet been granted for these properties. These additional investigations will be required before impacts to historic properties (if present) can be fully evaluated. Information gathered through these investigations will be coordinated with the Ohio SHPO and other consulting parties and subsequent evaluation of specific project components will be utilized to complete Section 106 consultation in accordance with the NHPA.

Plan F2: Blanchard to Lye Cutoff (Selected). The implementation of this measure is expected to incur long-term, moderate impacts. Borrow material would be obtained by excavating near the line of protection for the Blanchard to Lye Cutoff Levee. The area within which this activity would occur has not been examined for cultural resources as rights-of-entry have not yet been granted. This investigation will be required before impacts to historic properties (if present) can be fully evaluated. Information gathered through the investigation will be coordinated with the Ohio SHPO and subsequent evaluation of specific project components will be utilized to complete Section 106 consultation in accordance with the NHPA.

## 8.14 Utilities and Infrastructure

Plan F0: No Action (Not Selected). Environmental impacts to utilities and infrastructure are not anticipated through the implementation of this alternative.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Figure 8.14a and Table 8.14a below show the locations and type of oil and gas wells that occur within the proposed impact area for this measure. There are approximately 24 wells that are listed in the vicinity of the tentative alignment of this measure, with another 186 within the potential channel implementation zone. However, these wells were excavated in the late 1800's, were abandoned in the early 1900's, and have not been in use for over 100 years. These wells are largely not under pressure and are not anticipated to be free flowing at this time. In addition, the true location of these wells are not known due to a lack of surficial evidence as the casings were removed in the 1910s and the subsequent agricultural use of the area. Therefore, the risk associated with these wells is considered low. The accuracy of this data, however, cannot be verified due to limited site access. There are approximately 10 water wells that are listed in the vicinity of the tentative alignment of this measure, with another 36 within the potential channel implementation zone (Figure 8.14b and Table 8.14a). Any oil/gas or water wells occurring within the vicinity of this measure would need to be permanently capped and production (if any) would be lost. Estimates concerning the potential impacts to production are not presently known

due to the issue of limited site access. A windshield survey of the project alignment indicate no active oil and gas wells at the time of the survey (2014).

It is expected that, once the alignment is finalized, it will include approximately the same number of water wells, oil wells and plugged wells as the current tentative alignment depicts. However, efforts will be made to minimize impacts to these wells to the extent practicable.

Implementation of this alignment will include impacts seven pipeline crossings areas (Figure 8.14c). The rerouting of these pipelines is expected to incur minor environmental impacts over the short-term. The pipeline rerouting is proposed to occur within the same right-of-way as the previous pipeline; however, it will just be rerouted deeper through open trenching. No tree clearing or other surface area impacts are expected.

It is also expected that fiber optic lines could be moved/replaced with minimal disruption to water services and telecommunications.

The impacts associated with utilities and infrastructure under this measure are expected to be minor and occur over the short-term.

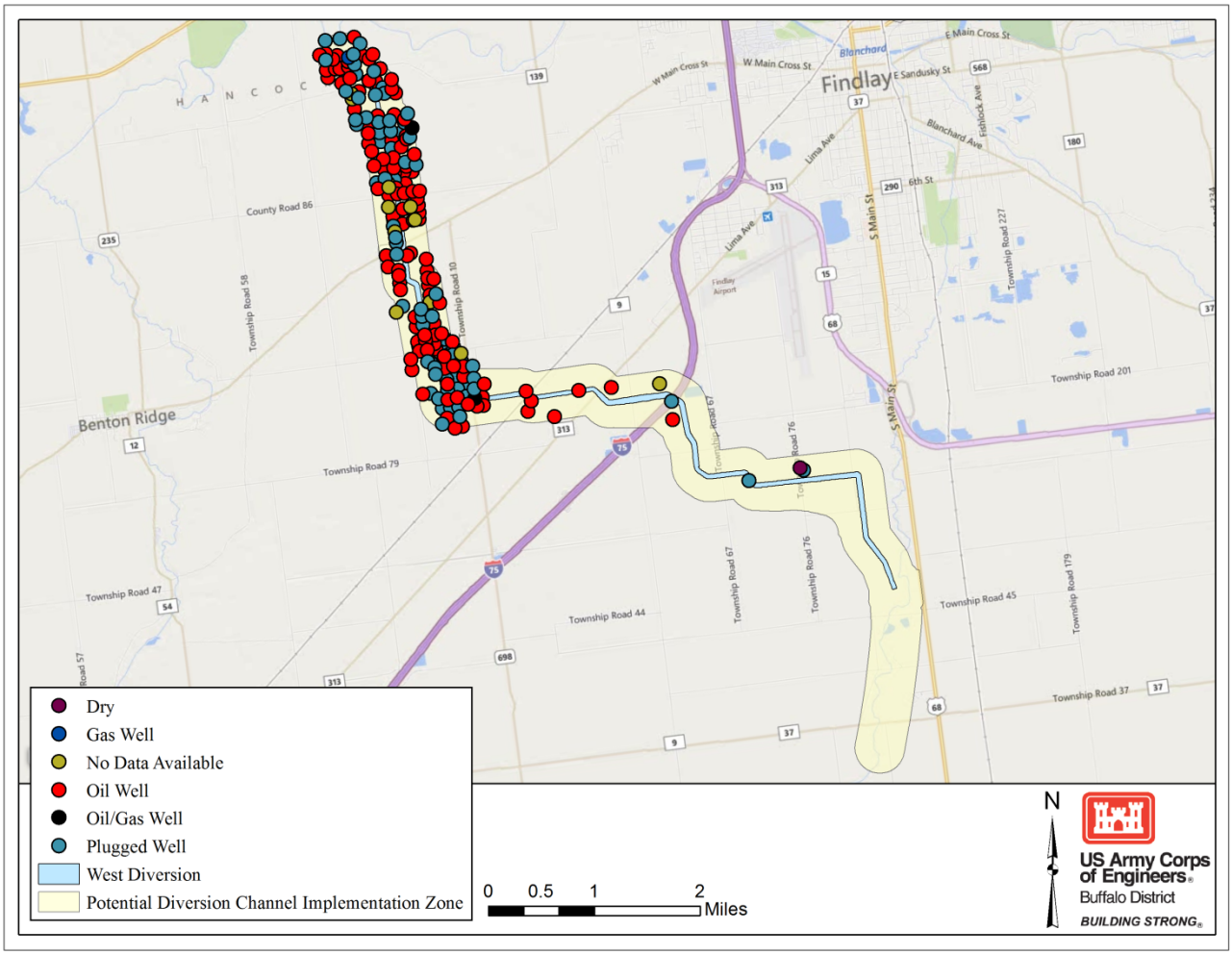


**Figure 8.14a. Known Underground Oil and Gas Wells within the Immediate Vicinity of the Western Diversion Alignment 2 Alternative.**

| Table 8.14a. Types of Wells that are within the Proposed Project Footprint of the Proposed Alternative 2 Alignment (ODNR) | | |
|---|---|---|
| **Type of Well** | **Proposed Channel Alignment** | **Potential Channel Implementation Zone** |
| Oil Well | 14 | 106 |
| Gas Well | 0 | 1 |
| Oil/Gas Well | 1 | 1 |
| Plugged Well | 9 | 65 |
| Dry Well | N/A | 1 |
| No Data Available | N/A | 12 |
| Water Well | 10 | 26 |

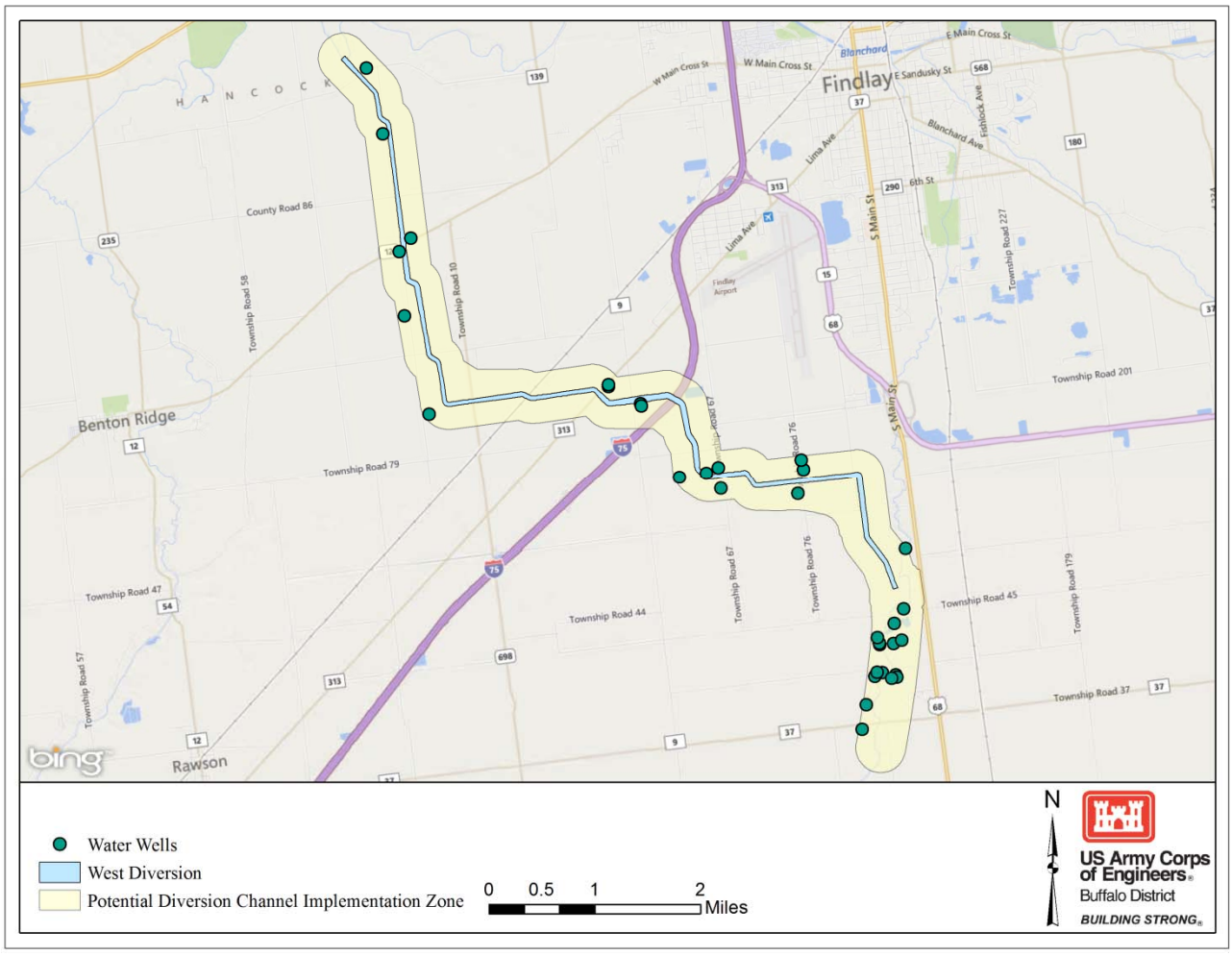


**Figure 8.14b. Known Water Wells within the Proposed Alternative 2 Alignment (ODNR)**

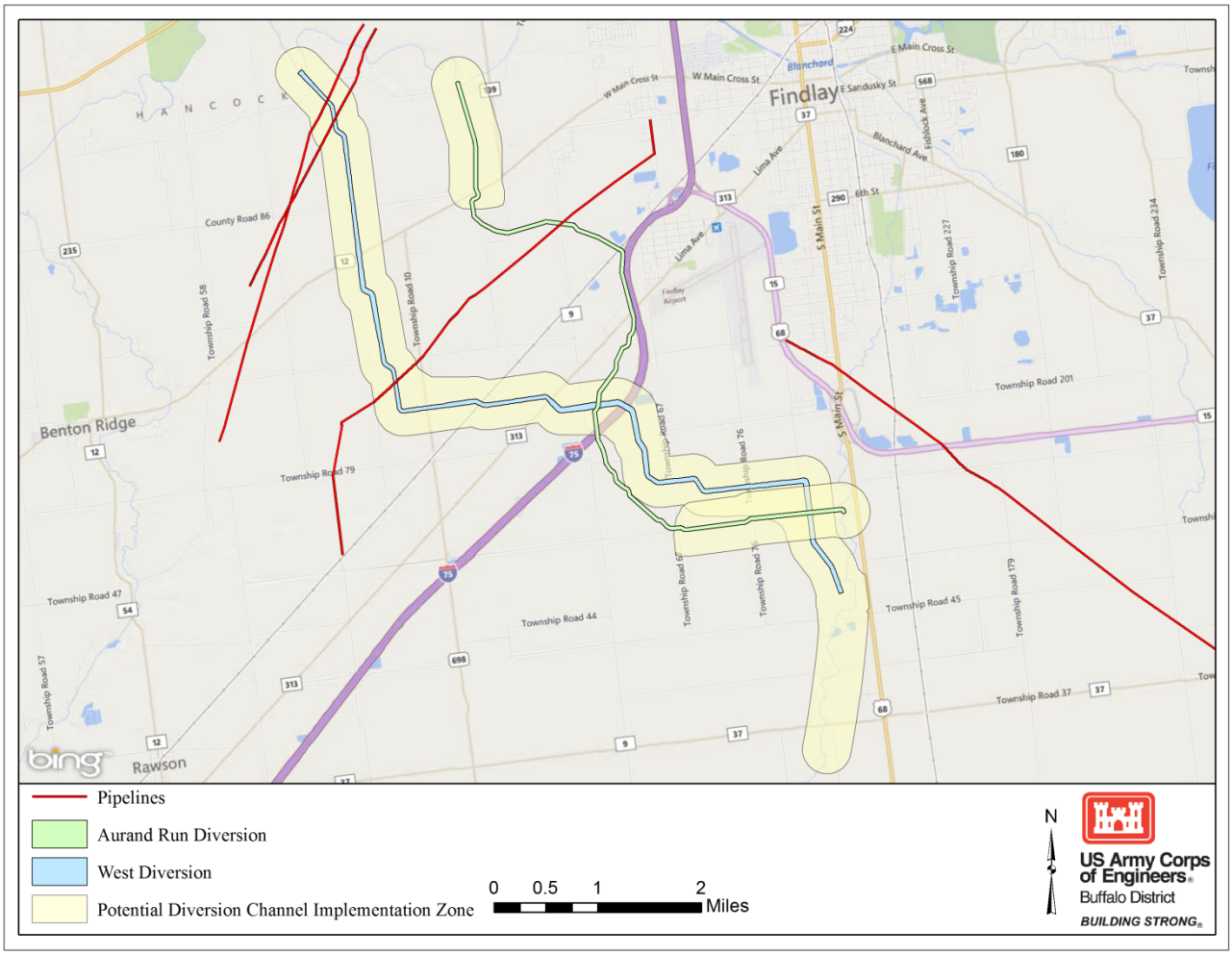


**Figure 8.14c. Pipelines within the Proposed Alternative 2 Alignment and the Aurand Run Alignment (ODNR)**

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). There are 11 known oil and gas wells that occur within the tentative Aurand Run alignment measure, with another 95 within the potential channel implementation zone (Figure 8.14d and Table 8.14b). These wells were excavated in the late 1800's, were abandoned in the early 1900's, have not been in use for over 100 years, are largely not under pressure, and are not anticipated to be free flowing at this time. In addition, the true location of these wells are not known due to a lack of surficial evidence as the casings were removed in the 1910s and the subsequent agricultural use of the area. Therefore, the risk associated with these wells is considered extremely low. There are two water wells in the vicinity of the tentative Aurand Run Alignment and approximately another 16 wells within the potential channel implementation zone (Figure 8.14e and Table 8.14b). Any oil/gas or water wells occurring within the vicinity of this measure would have to be permanently capped and production (if any) would be lost. Estimates concerning the potential impacts to production are not presently known due to the issue of limited site access. A windshield survey of the project alignment indicate no active oil and gas wells at the time of the survey (2014).

It is expected that, wherever the alignment is finalized, will include approximately the same number of oil wells and plugged wells as the current tentative alignment depicts. However, efforts will be made to minimize impacts to these wells to the extent practicable.

Implementation of this measure would include the intersection of one pipeline (Figure 8.14f). It is expected that this pipeline would be rerouted, with the option to deepen it within the area of the diversion channel so that they occur below the proposed measure.

It is also expected that fiber optic lines could be moved/replaced with minimal disruption to water services and telecommunications. The impacts associated with utilities and infrastructure under this measure are expected to be minor and occur over the short-term.

As outlined under the Alternative 2 Alignment, the impacts associated with utilities and infrastructure under the Aurand Run Alignment are expected to be minor and occur over the short-term.

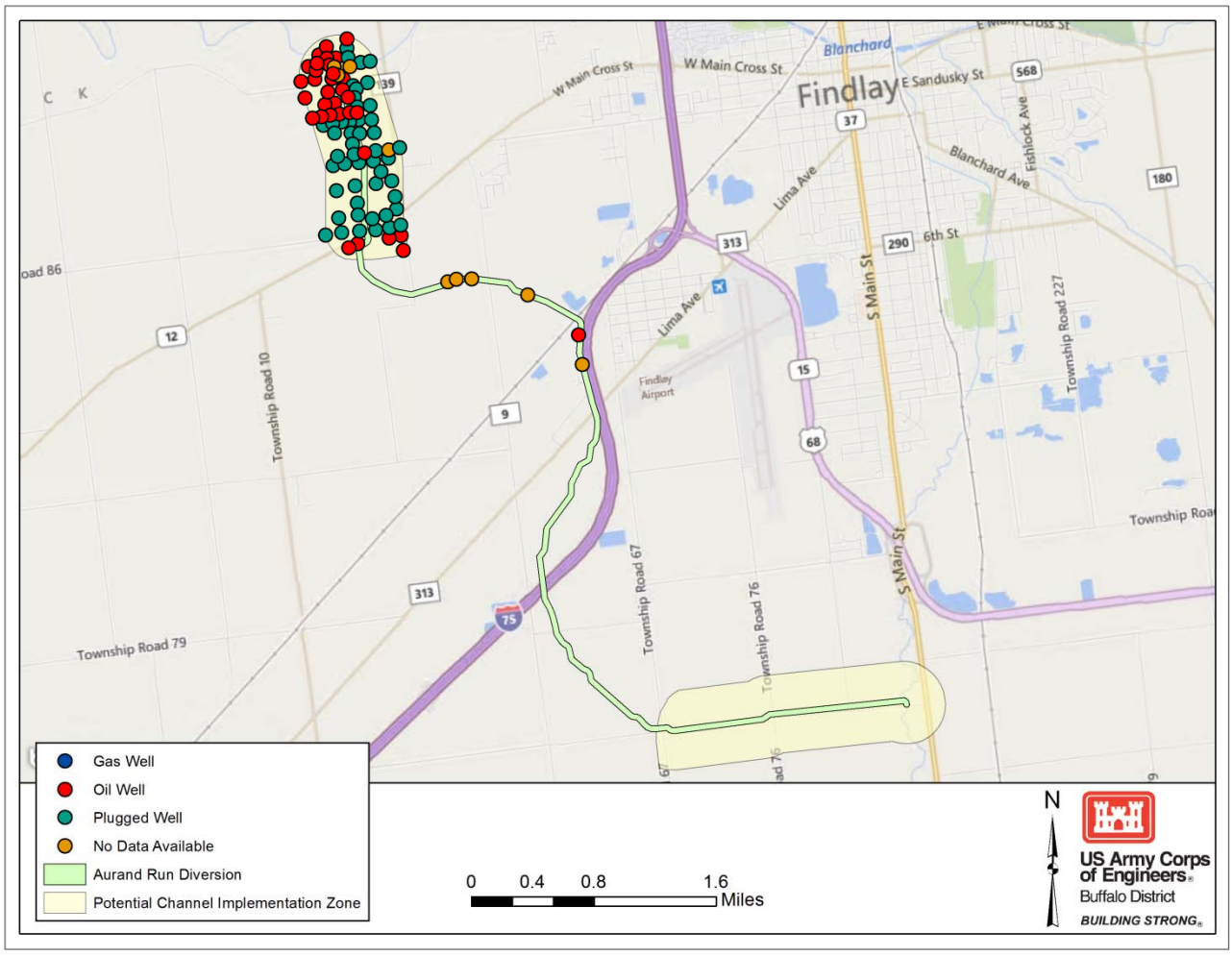


**Figure 8.14d. Known Oil and Gas Wells within the Proposed Aurand Run Alignment (ODNR)**

| Table 8.14b. Types of Wells that are within the Proposed Project Footprint of the Proposed Aurand Run Alignment | | |
|---|---|---|
| **Type of Well** | **Proposed Channel Alignment** | **Potential Channel Implementation Zone** |
| Oil Well | 4 | 29 |
| Plugged Well | 1 | 47 |
| No Data Available | 6 | 3 |
| Water Wells | 2 | 16 |


**Figure 8.14e. Known Water Wells within the Proposed Aurand Run Alignment (ODNR)**

Blanchard to Lye Cutoff (Selected). According to the ODNR Ohio Oil and Gas Well Database, there are no oil wells in the vicinity of the proposed measure. While impacts to utilities and infrastructure are not expected through the implementation of this measure, the existence of utilities that are presently undisclosed could lead to impacts. It is not expected that impacts, if they do occur, would be more than minor or occur over the long-term.

There are three water wells and an aqueduct that runs from the Findlay Reservoir to the city of Findlay within the proposed area of this measure (Figure 8.14f). It is not expected that any impacts to the three water wells will occur through the implementation of this measure, as the wells will be avoided during construction. It is important to note that the portion of the aqueduct occurring upstream of the reservoir is currently not in use and has been abandoned(Wilson, personal communication, 2014). The aqueduct will be capped, filled and grouted in the immediate vicinity of the levee.

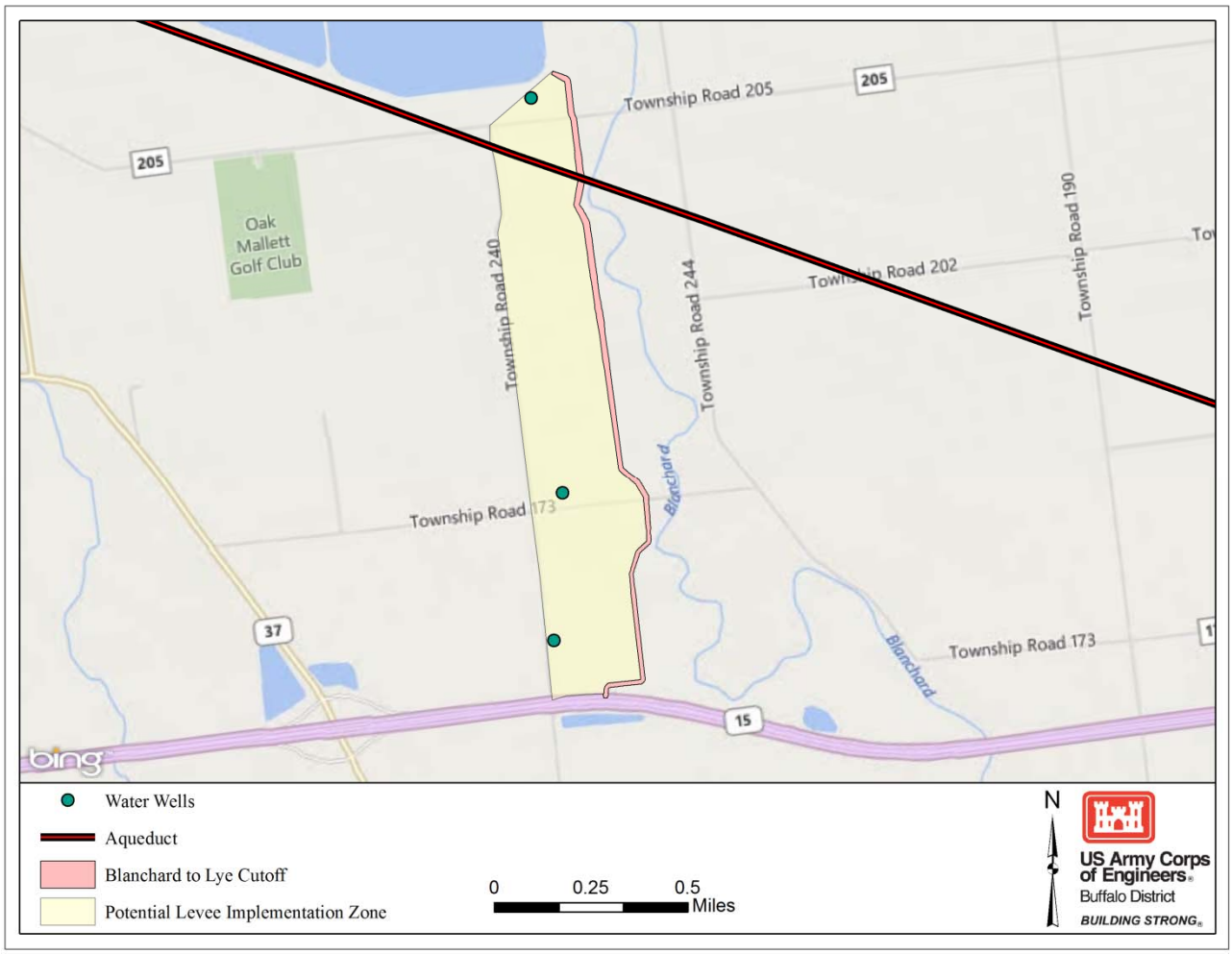


**Figure 8.14f. Known Underground Infrastructure Present within the Immediate Vicinity of the Blanchard to Lye Cutoff (USGS)**

## 8.15 Transportation

Plan F0: No Action (Not Selected). Significant environmental impacts to transportation are not anticipated through the implementation of the No Action alternative. However, continued significant period flood events are likely to disrupt some major transportation routes.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). The proposed alignment may (depending on final alignment) incur minor, short-term impacts to the existing bridge at Interstate 75 during construction. This alignment will also affect Township Roads (TR) 89, 130, 10, 77, 76, 67 and 49; County Roads (CR) 9, 313, 84 and 86; State Route 12, and the Norfolk Southern Railroad. (Figure 8.15a).

To prevent significant negative effects on transportation in the proposed project area, eight new bridge crossings (Township Road 67 and County Roads 9, 313, 84 and 86; State Route 12, Interstate 75 and the Norfolk Southern Railroad) which will permit traffic to cross the diversion channel during flood events are currently proposed. Five roads with average daily trips (ADT) of less than 200 per day (200 ADT = 100 vehicles per day), identified as Township Roads 89, 130, 10, 76, and 49, would cross the diversion channel by using dry crossings or would be converted to cul-de-sacs. These dry crossings would likely be composed of a raised roadbed with culverts to permit small amounts of water to pass under the roadways. During significant rain events where the diversion channel would be used, generally considered to be no more than 2 to 4 days per year, these crossings would be gated and closed to traffic.

Generally, traffic disruptions of less than 200 ADT are considered to be of minimal impact. A final decision to cross or convert the roads would be determined in a subsequent phase of the study, prior to completion of the Final Report/EIS. Impacts to emergency services are anticipated to be minor in the long term as each of the proposed crossing is within 1.5 miles of a bridge and crews will alter their routes to reflect the new crossings, resulting in a minimal impact on response times. This alignment is expected to incur minor, short-term impacts in the form of vehicle congestion during construction. Comments were received in mid-November 2014 asking consideration for constructing bridges for all road crossings of the diversion channel instead of some bridges and the remainder as dry crossings or cul-de-sacs. This comment is still under evaluation. The evaluation will be based on public comments, traffic counts, emergency service response, and the impact the crossing will have on the hydraulic effectiveness of the channel. A diversion channel inlet on Eagle Creek is also proposed with this alternative that will affect Township Road 48. In order to realize the proposed flood reduction with this measure, Township Road 48 must be raised by two feet.

Impacts to overall transportation networks as a result of implementation are expected to be

beneficial as the reduction in the frequency of flooding and in water surface elevations will maintain transportation routes in the project area and reduce the frequency of closures. West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). The proposed alignment would incur minor, short-term impacts to seven existing bridges, including Interstate 75 and the Norfolk Southern Railroad. Four other township roads, including Routes 89, 77, 76 and 67 would also incur minor impacts over the short-term during construction (Figure 8.15b). Interstate 75's traffic would not be negatively impacted. Additionally, moderate, long-term impacts are expected for State Route 12, County Routes 139, 9, and 313 as well as Township Roads 49 and 50, as these roads will have bridge transportation severed and replaced with cul-du-sacs. An in-line detention structure would also be required for implementation of this measure.

Impacts to overall transportation networks as a result of implementation are expected to be beneficial as the reduction in the frequency of flooding and in water surface elevations will maintain transportation routes in the project area and reduce the frequency of closures.

Blanchard to Lye Cutoff (Selected). This cutoff levee is expected to intersect County Roads 173 and 205 between Township Road 240 and 244, although the roads in these areas will be gradually raised up to the elevation of the levee during construction so that long term traffic impacts would be avoided. This measure is expected to incur only minor, short-term impacts during the construction phase. The construction can be staged such that Township Roads 240 and 244 will not be closed at the same time. As these roads have traffic of under 200 ADT, traffic impacts due to construction are anticipated to be minor. Impacts to overall transportation networks as a result of implementation are expected to beneficial as the reduction in the frequency of flooding and in water surface elevation will better maintain transportation routes in the project area and reduce the frequency of closure.

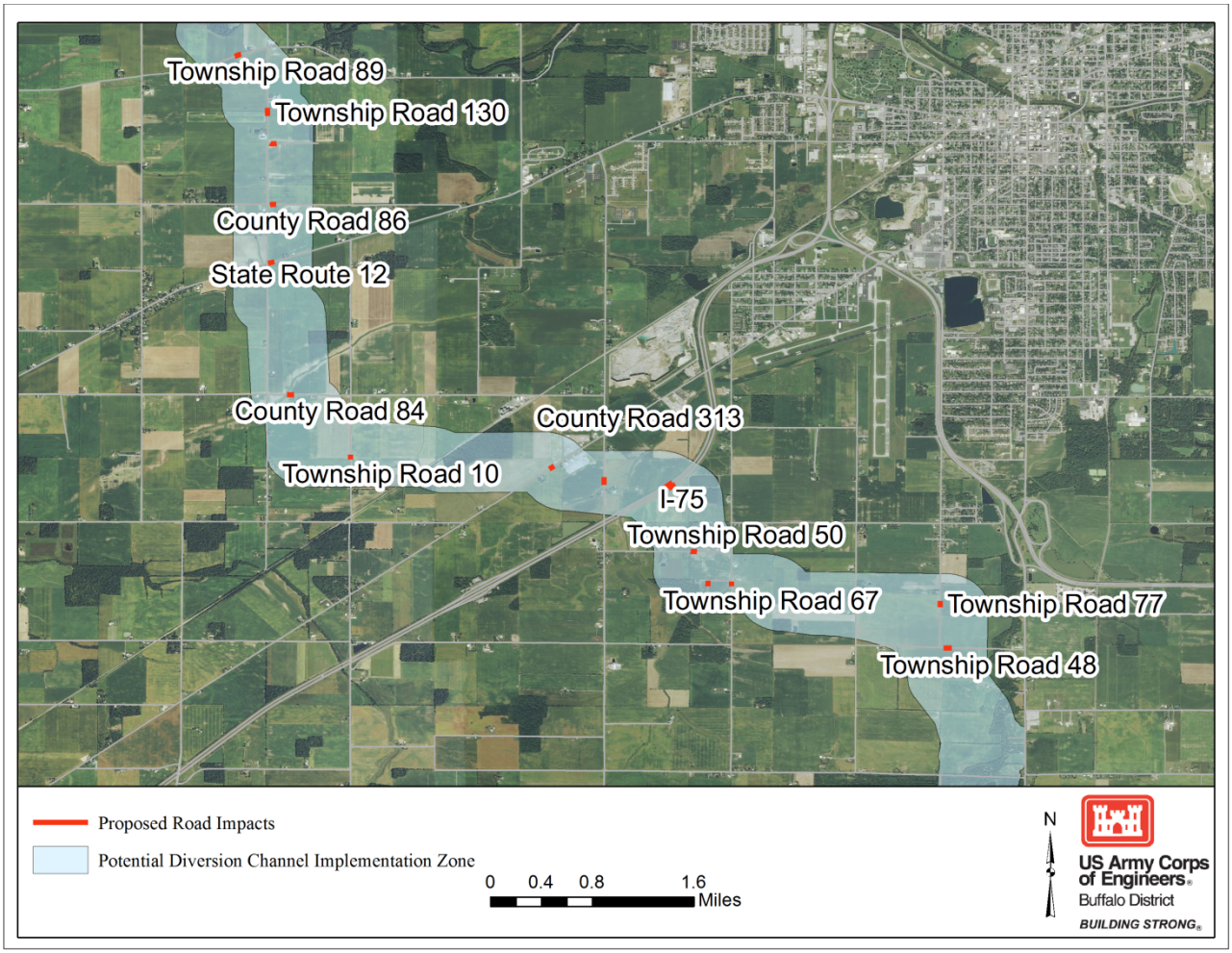


**Figure 8.15a. Road Impacts associated with the Alternative 2 Alignment**

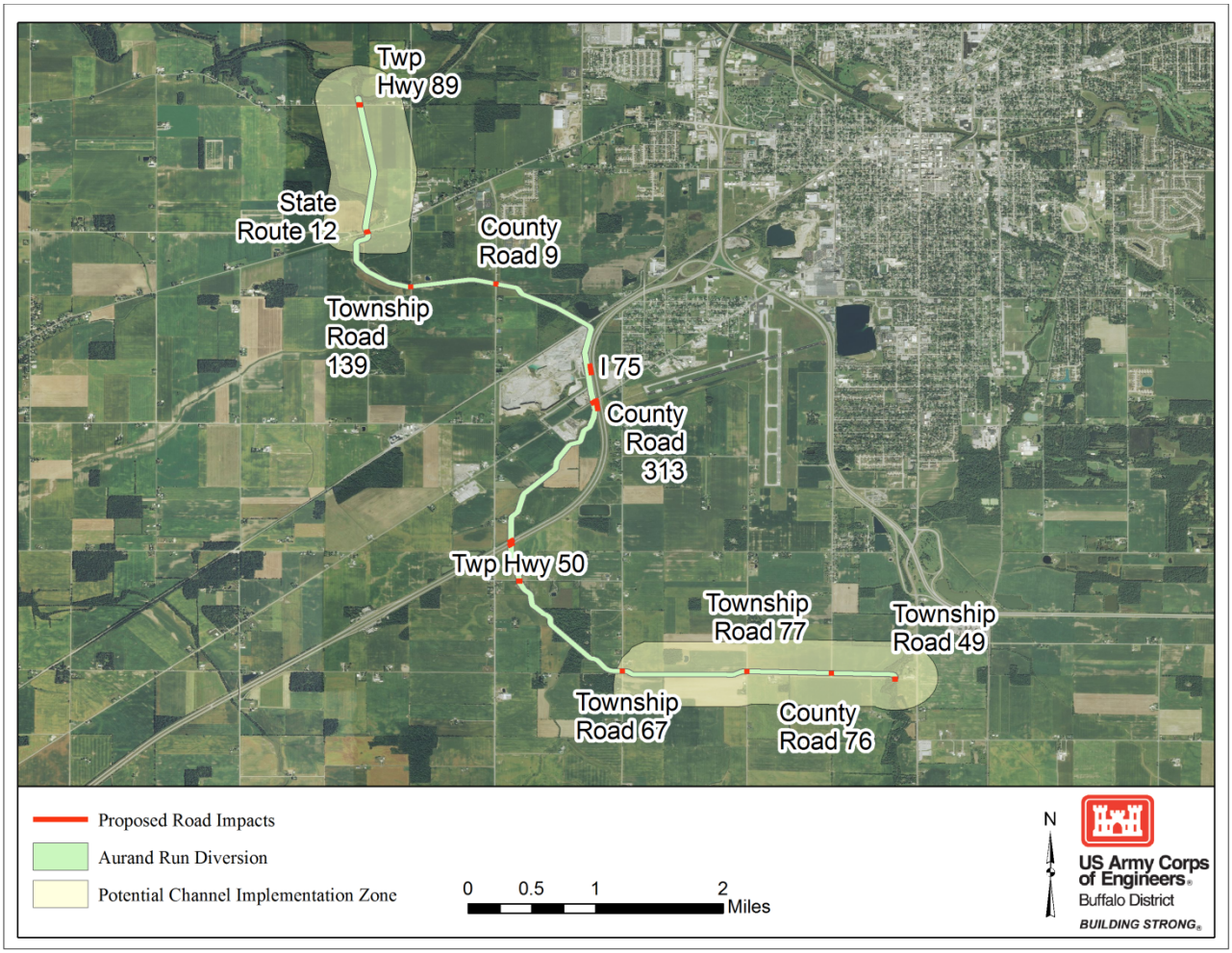


**Figure 8.15b. Road Impacts associated with the Aurand Run Alignment**

## 8.16 Aesthetics and Visual Resources

Plan F0: No Action (Not Selected). No impacts to the aesthetics within the project area are expected under the No Action alternative.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). This alignment would include moderate, long-term impacts to the aesthetics of the area (e.g., rural/agricultural). The diversion structure would be planted with native vegetation; however, it would be apparent that a non-natural, man-made structure is present, including rip-rap in high velocity sections of the alignment. Rip rap would also be placed at the confluence of the diversion channel and the Blanchard River to limit erosion in this area during high water events. This would lead to minor, long-term impacts to the aesthetics of this NRI-listed stretch of the Blanchard River.

Minor, short-term impacts to the Blanchard River in the form of increased flows would be expected to occur within the region of the river listed on the NRI during high water events. It is expected that an additional 250 CFS (compared to the pre-project 0.01 ACE flow event) would

flow from the confluence of the Blanchard River and the Alternative 2 Alignment toward Ottawa during a 0.01 ACE storm event, which would impact approximately 21.2 river miles of the NRI-listed waterway.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). This alignment would include major, long-term adverse impacts to the natural aesthetics of Aurand Run and its surrounding riparian corridor, including cutting through the middle of the Oakwoods Nature Preserve north of the quarry. The implementation of this measure would also include approximately 35,000 linear feet of impacts to warm water stream habitat for aquatic species. Within this reach of Aurand Run, another 18,000 linear feet of forested stream corridor would also be impacted as a result of the implementation of this measure. Rip rap would be placed at the confluence of the diversion channel and the Blanchard River to limit erosion in this area during high water events. This would lead to minor, long-term impacts to the aesthetics of this NRI-listed stretch of the Blanchard River.

Minor, short-term impacts to the Blanchard River in the form of increased flows would be expected to occur within the region of the river listed on the NRI during high water events. It is expected that an additional 250 CFS (compared to the pre-project 0.01 ACE flow event) would flow from the confluence of the Blanchard River and the Alternative 2 Alignment toward Ottawa during a 0.01 ACE storm event, which would impact approximately 22.5 river miles of the NRI-listed waterway.

Plan F2: Blanchard to Lye Cutoff (Selected). The construction of an approximately eight foot tall levee would affect the aesthetics of the surrounding area. The levee would have to be maintained with no vegetation other than grass on the levee as well as 15 feet from the toe. These impacts are expected to have minor, long-term impacts to aesthetics of the region.

## 8.17 Recreation

The parks/recreational areas that occur within the 0.01 ACE flood plain are expected to incur some level of benefit as a result of project implementation. These benefits would be realized with lower flood stages that would occur within portions of the project area following project implementation. Table 8.17 and Figures 8.17a and 8.17b outline the 13 parks and recreation areas that fall within the 0.01 ACE flood plain, and which are expected to incur benefits through implementation of the project.

| Table 8.17. Park and Recreation Areas that are subject to flooding events within Findlay, Ohio | |
|---|---|
| **Park/Recreation Area** | **Address** |
| Anchor Park | Central Parkway, Findlay, Ohio |
| Civitan Park | Central Pkwy., Findlay, Ohio 45840 |
| Emory Adams Park | S Blanchard St., Findlay, Ohio 45840 |
| Firestine Park | Brookhaven Rd., Findlay, Ohio 45840 |
| Hancock Park District Headquarters | 1424 East Main Cross St., Findlay, Ohio 45840 |
| Hancock County War Memorial | 300-308 N. Main St., Findlay, Ohio 45840 |
| Koehler Field | First St., Findlay, Ohio 45840 |
| K-9 Field of Dreams Dog Park | Marion Township 208, Findlay, Ohio 45840 |
| Litzenberg Memorial Woods | 6100 U.S. Route 224, Findlay, Ohio 45840 |
| Rawson Park | 720 River St., Findlay, Ohio 45840 |
| Riverbend Park | Marion Township 208, Findlay, Ohio 45840 |
| Riverside Park | 231 McManness Ave., Findlay, Ohio 45840 |
| Swale Park | N. West St., Findlay, Ohio 45840 |

Plan F0: No Action (Not Selected). Under this alternative, it is expected that 13 of the 22 parks/recreation areas within the vicinity of Findlay would continue to be subject to the present periodic flooding severity/duration.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). Implementation of this measure is expected to incur moderate, long-term benefits to recreation within Findlay, as it would alleviate/reduce flooding impacts in 13 parks in the area. On the other hand, it is also expected that this measure would lead to an additional 250 cfs in flow (compared to pre-project conditions at the 0.01 ACE event) within the Blanchard River through Litzenberg Memorial Woods at the 0.01 ACE storm level. These impacts to this recreation area are expected to be moderate and short-term in nature, as it would only occur during high water events. Some short-term park closures resulting from inundation during high water events would be expected to occur within some of the recreation areas. These impacts are expected to be short-term and are not expected to include park closures due to damages of structures, park infrastructure or multi-use fields.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). Implementation of this measure is expected to incur moderate, long-term benefits to most recreational areas within Findlay, as it would alleviate/reduce flooding impacts in 13 parks in the area. However, major long-term adverse impacts would be expected to the Oakwoods Nature Preserve through which this measure would likely bisect near Interstate 75. This 227-acre preserve offers over four miles of hiking trails, fishing opportunities and a Discovery Center. The portion of Aurand Run that extends through this Preserve is surrounded by mature deciduous forest.

Plan F2: Blanchard to Lye Cutoff (Selected). The implementation of this measure is expected to incur moderate, long-term benefits to recreation within Findlay, as it would alleviate/reduce flooding impacts in 13 parks in the area.

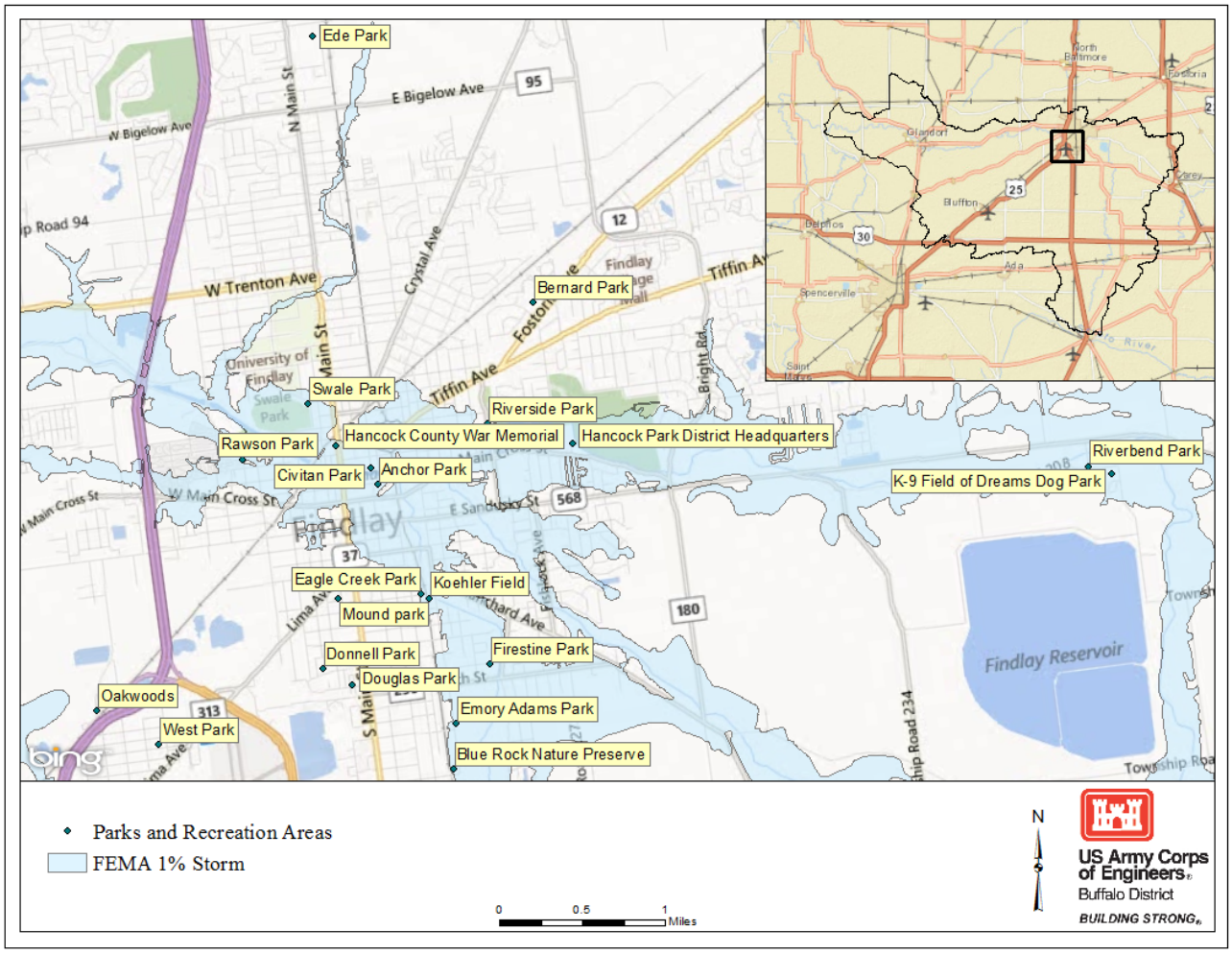


**Figure 8.17a. Park and Recreation Areas in relation to the FEMA 0.01 ACE Flood Zone in the City of Findlay, Ohio**

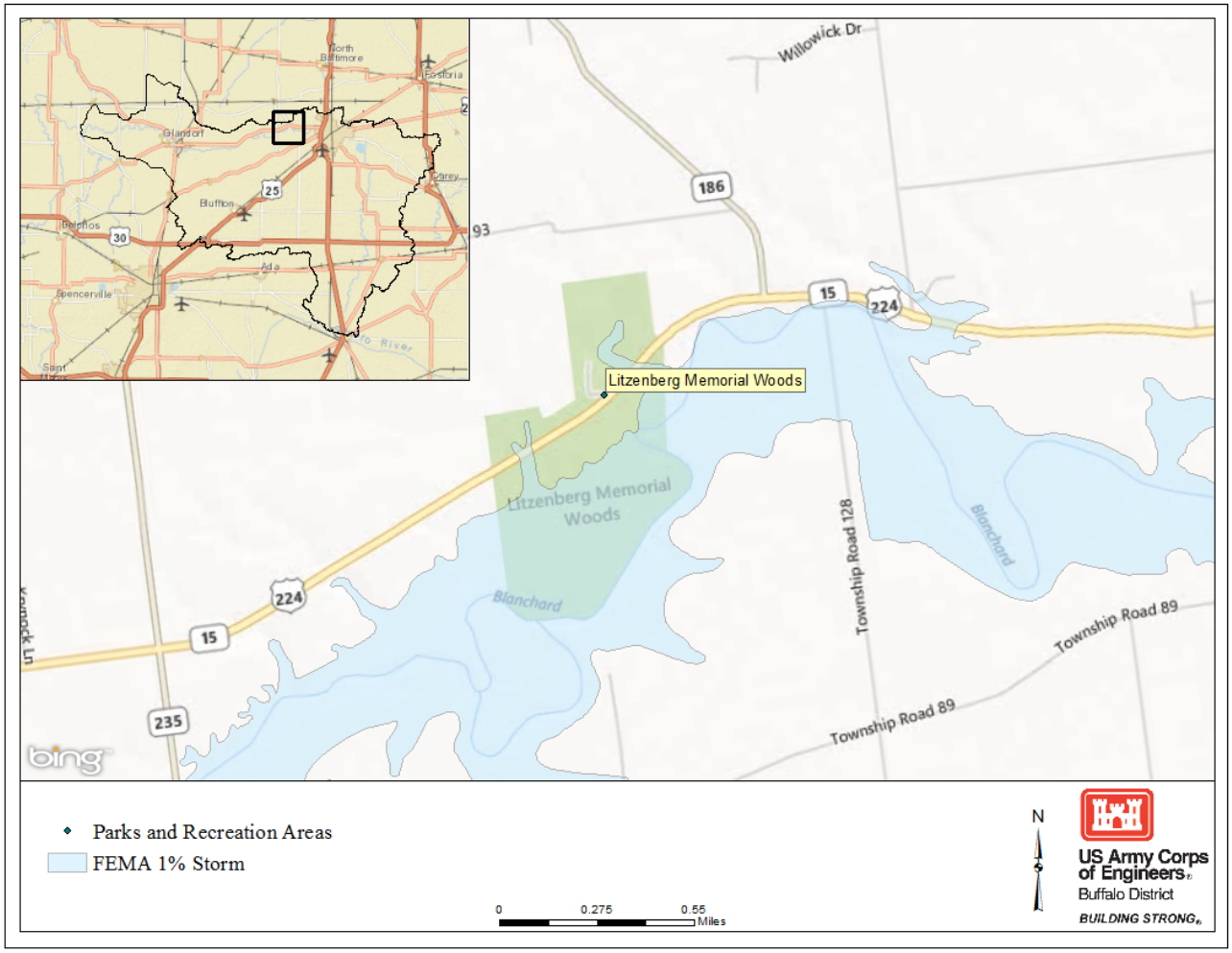


**Figure 8.17b. Litzenberg Memorial Woods in relation to the FEMA 0.01 ACE Flood Zone**

## 8.18 Hazardous Substances/Petroleum Products

Plan F0: No Action (Not Selected). No effects to any hazardous substances or petroleum products in soil, groundwater, or surface water are anticipated.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected). This feature would have a construction footprint that includes properties that contain an abandoned tank farm, a documented petroleum spill, and an excavated tank with piping. Because of a lack of site access, contamination has not been verified on parcels within the tentative project footprint and would require field investigation and laboratory analysis to determine whether hazardous substances or petroleum products are present. The alignment may be adjusted to minimize the risk of exposure of the project to HTRW and petroleum products. The implementation of this measure is not expected to incur any long-term impacts. Remediation of any contaminated areas, if necessary, would the responsibility of the non-federal project sponsor. See Hazardous Substances/Petroleum Products Section of the Environmental Appendix.

West Diversion of Eagle Creek – Aurand Run Alignment (Not Selected). No effects to any hazardous substances or petroleum products in soil, groundwater, or surface water are anticipated.

Plan F2: Blanchard to Lye Cutoff (Selected). No effects to any hazardous substances or petroleum products in soil, groundwater, or surface water are anticipated through the implementation of this measure based on completed survey work.

## 8.19 Socioeconomics

Plan F0: No Action (Not Selected). The socioeconomic impact of this alternative would depend greatly on future watershed land use patterns, as well as flood frequency and intensity. It is reasonable to expect that businesses would be less likely to move to, or possibly remain in, the area due to flood risks, which would limit potential job opportunities and growth potential. Housing demand would also likely remain below optimal levels due to flood risks, which may decrease aggregate home values. The No Action alternative would therefore lead to major, long-term adverse impacts to the socioeconomics of the region.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected) & Aurand Run Alignment (Not Selected). Overall community socioeconomics should experience moderate, long-term benefits from the implementation of these measures. Either diversion option would decrease the risk and intensity of flooding in most areas and the damages associated with it. Businesses would be less likely to relocate to other areas, therefore helping to maintain jobs. The general population would also be less likely to move out of the area, which would help to maintain the current tax base. If either measure were implemented, there would be a short-term increase in construction and related jobs. The diversion channel measure may, however, negatively impact crop yields, oil/gas wells and road traffic (see sections 5.1, 5.14 and 5.15, respectively for further information).

Plan F2: Blanchard to Lye Cutoff (Selected). Impacts to community socioeconomics resulting from this measure are expected to be similar to above, except that some existing farmland would not be converted to diversion channel but instead likely be used to construct an earthen levee.

## 8.20 Environmental Justice

*Minority Analyses*

Based on the American Community Survey of 2010, the city of Findlay was comprised at the time of a 12 percent minority population. One area within the proposed Alternative 2 alignment has a minority population over the 12 percent threshold for the city. However, this would not be considered an injustice to the minority population. The Blanchard to Lye Diversion measure would occur within an area that has a range of 0 to 10 percent minority population, which is below the city average for minority population.

*Poverty and Income Analyses*

The city of Findlay has a poverty rate of 18.3 percent compared to the State of Ohio which has a poverty rate of 19.6 percent. An analysis was conducted to identify census tracts with poverty rates higher than the average for the city of Findlay. Poverty rate data was aggregated into census tracts instead of census blocks to help better protect the possible at risk populations in Findlay. There is only one area that has a higher poverty rate percentage than the average for Findlay. This area has a below poverty rate of 20.54 percent which is just slightly over the 18.3 percent for the city. Per capita income in the city of Findlay is $24,845 compared to $25,785 in Hancock County, and $25,857 in the State of Ohio.

*Environmental Justice Conclusions*

Long-term impacts of the diversion channel and its associated structures would include some induced flooding upstream and impact farmland. Areas of induced flooding were overlaid with census data to visualize areas that may disproportionately impact at risk populations.

Data was collected and analyzed using USEPA's "Toolkit for Assessing Potential Allegations of Environmental Injustice," enabling assessment of the potential for "disproportionately high and adverse" effects or impacts (USEPA, 2004). This toolkit defines "disproportionately high and adverse" as: "(1)...predominately borne by any segment of the population, including, for example, a minority population and/or a low income population; or (2) will be suffered by a minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect or impact that will be suffered by a non-minority population and/or non-low-income population."

At a national level, environmental justice concerns have primarily focused on populations considered to be minority and/or low-income. However, since environmental justice is defined as the fair treatment and meaningful involvement of all people, the final decision should be whether the affected area is likely to, or is already, impacted by greater adverse effects than a demographically similar reference community.

Education level was also considered as part of the environmental justice review. The areas that will be inundated by the flowage easement are populated with people who have either a high school diploma or a college degree. The area with the highest percentage of less than a $12^{th}$ grade population had approximately 13 percent of its population with that education level. Areas above and below the proposed structures do not have any outlier populations with lower than average education levels.

The distribution of minority populations within the study area does not indicate any disproportionate impact on such populations. The areas of induced flooding are predominantly where the population speaks English well. The other areas have a 3.1 percent of the population

that responded to the ACS 2010 saying that they do not speak English well. A study of the populations that do not speak English well also indicates that there are no disproportionate impacts on minorities opposed to the rest of the reference community.

Areas of induced flooding also do not disproportionately impact areas that have higher percentages of populations under the age of 18.

Neither the "No Action" alternative (not selected), the Blanchard to Lye Cutoff Measure (selected), or the West Diversion Measure (Alternative 2 [selected] or Aurand Run [not selected]) are expected to disproportionately affect minority or low-income populations.

## 8.21 Human Health and Safety

Plan F0: No Action (Not Selected). High flow events have become more frequent in the Blanchard Watershed in the recent past. The No Action alternative represents a major, long-term impact to human health and safety within the Blanchard Watershed. Major storm events have lead to increased flooding frequency and intensity. These larger more dramatic flooding events pose significant hazards to the human health and safety of residents of Findlay and the surrounding areas.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected) & Aurand Run Alignment (Not Selected). This alignment is expected to have major, long-term beneficial effects on public health and safety by reducing the risk of loss of life, and other health risks associated with major flooding events. See Section 8.15 for evaluation of transportation-related impacts. In accordance with this evaluation, response times may be temporarily affected by the construction of the bridges in the area. Routes will have to be permanently changed on the roads that will be ended in a cul-de-sac; however, these areas will still have access by other routes with minimal delay in emergency vehicle response time.

Plan F2: Blanchard to Lye Cutoff (Selected). With construction of this levee, there would be major, long-term benefits to human health and safety. The levee would reduce flooding for much of the city of Findlay during high flow events by preventing flood waters from overflowing the banks upstream of the city and flowing overland toward Lye Creek inundating more heavily populated areas. Accordingly, this measure would reduce the risk for loss of life and other health risks associated with major flooding events.

## 8.22 Sustainability, Greening, and Climate Change

Short-term, minor impacts to sustainability and greening would be expected from implementation of the recommended plan. Each flood risk management and mitigation measure would be constructed using contemporary construction techniques, equipment and materials. Waste produced during the construction phase would be diverted from landfills through recycling and be reused to the extent feasible. No significant effects regarding GHG emissions

or climate change would be expected.

Plan F0: No Action (Not Selected). No impacts to sustainability and greening would result from implementation of the No Action alternative. No flood risk management measures would be constructed and there would be no change from baseline conditions. No effects regarding GHG or climate change would be expected.

Plan F2: West Diversion of Eagle Creek – Alternative 2 Alignment (Selected) & Aurand Run Alignment (Not Selected). Long-term minor adverse effects on sustainability and greening would be expected from implementation of this measure. The proposed diversion channel would be constructed using modern construction techniques and materials (e.g., earth/rock excavation, concrete). Waste produced during the construction phase would be diverted from landfills and recycled to the extent feasible, and construction methods would utilize applicable Department of Defense (DoD) Unified Facilities Criteria, Unified Facilities Guide Specifications, and related BMPs where applicable. The proposed diversion channel would create a long-term environmental footprint that did not exist under baseline conditions. However, it will be planted/seeded with appropriate native species in appropriate locations to ensure bank stability. Where feasible, such plantings would also utilize environmentally sustainable designs in an attempt to incorporate higher value wildlife habitat within the corridor. No long-term effects regarding GHG or climate change would be expected with implementation of this measure.

Plan F2: Blanchard to Lye Cutoff (Selected). Long-term minor adverse effects on sustainability and greening would be expected from implementation of this measure. The proposed levee would be constructed using modern construction techniques and materials. Waste produced during the construction phase would be diverted from landfills and recycled to the extent feasible, and construction methods would utilize applicable DoD Unified Facilities Criteria, Unified Facilities Guide Specifications, and related BMPs where applicable. The proposed diversion levee would create a long-term environmental footprint that did not exist under baseline conditions. No long-term effects regarding GHG or climate change would be expected.

## 8.23 Cumulative Impacts

A cumulative impact is defined as resulting "from the incremental impact of the action when added to other past, present, or reasonably foreseeable future action regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR Parts 230.11(g) & 1508.7). Such impacts can result from individually minor, but collectively significant actions taking place over a period of time. Evaluations of cumulative impacts include consideration of the proposed action with known past and present actions, as well as reasonably foreseeable future actions. In assessing cumulative effects, the key determinant of importance or significance is whether the incremental effect of the proposed action will alter the sustainability of resources when added to other present and reasonably foreseeable future actions. Implementation of any of the proposed flood risk management measures would benefit Findlay residents and portions of

the surrounding community in a sustainable way in the form of flood damage reduction.

Cumulative environmental effects for the proposed project were assessed in accordance with guidance provided by the President's Council on Environmental Quality (CEQ) (CEQ, 2010). This guidance provides an eleven-step process for identifying and evaluating cumulative effects during NEPA analyses. The overall cumulative impact of the proposed project is considered to be socially, and economically beneficial.

An information request was made to local, state and federal agencies concerning any historical, current, and reasonable foreseeable projects or activities by others that may constitute impacts that could be additive in nature when viewed in the context of this proposed project. Agencies contacted included the USFWS, ODNR, OEPA, ODOT, Ohio SHPO, the Ohio Office of Workforce Development (OOWD), as well as public officials with Hancock County. These known actions by USACE or other agencies/entities within the Blanchard River Watershed include, but may not be limited to:

- *Blanchard Six-mile Diversion Extension Project* – This diversion channel extension is not part of the Blanchard River Project proposed by the USACE, but may be included as a betterment if selected by the local sponsor. The goal of this potential locally-led project would be to further reduce the risk of flooding due to variability of storm intensities within the watershed by diverting Blanchard River flows upstream of the city of Findlay to the west where it would tie into the USACE Western Diversion Channel at Eagle Creek. Implementation of this project would not have any negative impact on the implementation of the present USACE project, but could have a cumulative negative impact on wetlands and streams as the non-Federal project would need to cross Lye Creek, and tie into the Blanchard River. It is also not expected that the implementation of the recommended project would have any negative impacts to the six-mile extension project, but rather that they would work together synergistically to reduce flood risk within the Blanchard Watershed during high water events. If implemented, the cumulative impact of these projects would have an increased impact on floodplains as it would further increase floodplain reduction. Implementation of the non-Federal project could require changes to the existing configuration of the diversion structure and channel, which could have a cumulative negative impact on wetlands and streams. Cumulative impacts related to hydrology would be dependent on timing of flows, the amount of flow taken out of the Blanchard River, and the configuration of the channel with Lye Creek. Depending on the design, the project could have an impact on the use of prime farm land since more of this resource would be taken out of production.

- *Village of Ottawa Flood Risk Management Project* – This project would be implemented by the village of Ottawa, located approximately 24 river miles downstream of Findlay. It includes the removal of a portion of the I-9 bridge embankment, construction of a diversion channel (< one mile) to cut off a meander upstream of the I-9 Bridge, and

nonstructural measures offering flood protection to the ten year flood event level. Implementation of this project would further reduce flood risk in the village of Ottawa and is not expected to have any negative impact on the implementation of the present project in Findlay or other areas of the Blanchard River Watershed. Due to the distance between the village of Ottawa and the recommended project, it is not expected that there will be any appreciable interaction between the projects and cumulative impacts are anticipated to be minimal. It is also not expected that the implementation of the present project would have any negative impact to the Ottawa project, but rather that they would work together synergistically to reduce flood damages in the Blanchard River Watershed during high water events.

- *Flood Debris Removal in the Blanchard Watershed* – The OOWD secures and facilitates National Emergency Grants from the U.S. Department of Labor to enable the removal of flood debris from public lands and waterways and to assist with repair and cleaning or demolition of damaged public structures and facilities that occur as a result of significant flooding events (Collins, personal communication, 2014). These efforts include tree and other debris clearing from waterways, which serves to assist with flood reduction within the Blanchard River Watershed. It is important to note that these efforts are in response to flood events and may decrease or cease entirely if flood damages within the watershed were decreased or alleviated. It is also not expected that the implementation of the present project would have any negative impact to the flood debris removal project, but rather that they would work together synergistically to reduce flood damages in the Blanchard Watershed during high water events, resulting in a positive cumulative impact.

- *Nutrient Reduction Project* – The Upper Blanchard Watershed Nutrient Reduction Project is an initiative lead by the Blanchard River Watershed Partnership. This effort targets agricultural nutrient reduction through the use of BMPs that reduce sediment and nutrient loading as well as manure pollution, replacing failing residential septic systems, conduct riparian restoration, and the overall improvement of water quality in the Blanchard River Watershed. It is not expected that impacts to the Nutrient Reduction Project would occur through the implementation of the proposed project or vice versa. Therefore, any cumulative impact between these projects is anticipated to be minimal.

- *Road and Highway Betterments* –ODOT is planning on making improvements to Interstate 75 through Findlay, which would include the Route 15/Interstate 75 interchange. The timing of this project may lead to additive impacts to water quality through sediment erosion within the Blanchard Watershed if it coincides with construction of the flood risk management measures associated with the USACE project. It is expected that these impacts would occur over the short term and that any future construction associated with this project would include the use of BMPs to minimize impacts to water quality. USACE provided ODOT with a draft hydrologic and hydraulic

model to reduce the risk of cumulative impacts as a result of highway and bridge upgrades. In addition, as part of the project, ODOT is required to obtain a permit from the city of Findlay in accordance with their Floodplain Ordinance. It is possible that the ODOT project could require fill for its completion, which may be provided by the USACE project through the soil excavation required to built the diversion channel. Thus it is possible that costs for both projects could be reduced (through less soil transportation costs for the present project as well as less cost for necessary fill for the ODOT project). The USACE will continue to coordinate with ODOT in the future regarding these two projects, as appropriate. Due to existing and future efforts towards coordination, cumulative impacts are anticipated to be minimal.

- *The Lye Creek Ecosystem Restoration Project* – The USACE Buffalo District is presently looking into the feasibility of implementing an Ecosystem Restoration Project within the Upper Blanchard River Watershed. This potential project would look to restore and sustain riparian ecosystem structure and function, restore natural hydrology and in-stream hydrologic functions, and restore habitat suitability and connectivity for aquatic and terrestrial species. The project is scalable, and would include the restoration of approximately 23 linear miles of headwater streams, encompassing approximately 435 acres if implemented. It is expected that this project may incur short-term impacts on the present project during the construction phase such as increased erosion and turbidity until natural vegetation is established. However, BMPs including the use of siltation barriers to prevent sediment flow into nearby waterways, would minimize impacts to the present project. It is not expected that negative impacts to the Lye Creek project will occur from the present project, as the Lye Creek project area is well upstream of the present project area. The cumulative impact of the Lye Creek project with this project is anticipated to be positive as the Lye Creek project will improve water quality in the basin as well as slow the velocity of flows in the stream which generally improve flood flows in the area.

# 9.0 Environmental Compliance

## 9.1 National Environmental Policy Act

A NEPA scoping document for this study was released in June 2009 under the initial study authority, which was Section 205 of the Flood Control Act of 1948. Project alternatives then developed which required that the study authority be changed to a General Investigation under Section 441 of the Water Resources Development Act of 1999 (WRDA 99). A second scoping document was therefore released in December 2012 to provide the public, interested tribal organizations, and pertinent agencies with information concerning the study and additional opportunity to submit comments. On November 30, 2012 a Notice of Intent to prepare an EIS was published in the Federal Register (FR Volume 77, Number 231). Public scoping meetings were held on December 10, 11, and 12, 2012 (see Section 10.3 for further information concerning the Scoping Meetings). A Notice of Availability for this Draft EIS will be published

in the Federal Register, and the Draft EIS will be circulated for a period of 45 days. It is important to note that the present report is a draft document and the associated project designs can change based on public input during the 45 day public comment period.

In accordance with the Council on Environmental Quality's "Regulations for Implementing the Procedural Provisions of the NEPA of 1969" (40 CFR 1500-1508) and Engineer Regulation 200-2-2 (Procedures for Implementing NEPA), the USACE has assessed the significant environmental impacts of the alternatives and the tentatively selected plan in the draft EIS and will incorporate comments received during the next public comment period into the final EIS and the Record of Decision.

## 9.2 Clean Water Act

A Clean Water Act Section 404(b)(1) Evaluation has been prepared for the recommended plan and also includes an evaluation of the Aurand Run Alignment (see Environmental Appendix for full evaluation). The discharge of fill material into waters of the United States (i.e., streams, wetlands) associated with any project would require that an application for water quality certification be submitted in advance to OEPA. Pre-application coordination has been on-going with OEPA since 2009 to facilitate their input as early as possible into the USACE Planning Process, and regarding potential future Section 401 water quality certification.. Six additional meetings were held over the past five years with representatives from OEPA to discuss study measures and developments and to help ensure that any resource concerns are taken into consideration. Coordination with OEPA to date has assisted with the avoidance and minimization of potential stream and wetland impacts associated with tentative project measures and has also informed the development of the draft Stream and Wetland Mitigation Plan included in this report. The OEPA and USACE will draft a Memorandum of Understanding (MOU) that outlines the path forward to achieving full compliance with Section 401 of the Act. A draft mitigation plan is provided as an appendix to this Feasibility Report, and would be finalized during the future Preconstruction Engineering and Design (PED) Phase. A Section 404(a) public notice and application for Section 401 water quality certification would also be executed during this PED phase.

## 9.3 Fish and Wildlife Coordination Act

Formal coordination with the USFWS Ohio Field Office initiated with the release of the scoping document in December, 2012. In their June 2014 Fish and Wildlife Coordination Act Report, the USFWS cites fish and wildlife resources in the project area that could be negatively impacted by the proposed project, which includes bald eagles, migratory birds, freshwater mussels, riparian forest, streams, wetlands, fish and macroinvertebrates (USFWS, 2014a). The following recommendations were provided within the Fish and Wildlife Coordination Act Report:

- Remove the following project alternatives from consideration:
    a. Westward Diversion of Eagle Creek via Aurand Run

b. In-line Detention of Eagle Creek

- Avoid tree clearing to the maximum extent possible. Where tree clearing is unavoidable, conduct tree clearing only from October 1 through March 31 to minimize impacts to Indiana bats, northern long-eared bats, and migratory birds.
- Avoid and/or minimize all stream and wetland fills.
- Conduct mussel surveys and relocations following the most current version of the Ohio Mussel Survey Protocols.
- Consult with the Service pursuant to Section 7 of the Endangered Species Act of 1973, as amended.
- Do not conduct in water work from March 1-June 15, to minimize impacts to fish spawning activities.
- Conduct in water work only during low flows to minimize sedimentation. Develop and implement a storm water pollution prevention plan.
- Keep all construction activities a minimum of 200 meters from any bald eagle nests.
- Restore acquired parcels to upland and wetland forest.
- Use "Guidelines for Wetland Mitigation Banking in Ohio" to develop habitat restoration planting plans, success criteria, and monitoring protocols. Develop and implement remedial actions if/when habitat restoration areas do not achieve success criteria.
- Protect all habitat restoration areas in perpetuity through a conservation easement or environmental covenant.
- Explore additional options for habitat restoration.
- Coordinate with ODNR, DOW to avoid impacts to state-listed species.

All applicable recommendations have been considered during the Planning Process of this study, and coordination with USFWS and ODNR is on-going. Habitat restoration measures outside of compensatory mitigation are not part of this study and are therefore not applicable.

## 9.4 Endangered Species Act

Formal coordination with the USFWS Ohio Field Office initiated with the release of the latest scoping document in December, 2012. A letter sent to the USACE from the USFWS Ohio Field Office on December 20, 2012 outlined the federally-listed species that may occur within the vicinity of the project area and provided recommendations to minimize the likelihood of project impacts on fish and wildlife in the project area. A Fish and Wildlife Coordination Act Report was provided in June 2014. This document cited the presence of federally-listed bats and freshwater mussels. The USFWS, USEPA and ODNR recommend keeping tree clearing to a minimum (especially within riparian areas) and within the appropriate environmental window (October 1 through March 31) to avoid impacts to federally-listed bats within their active season. Indiana bat habitat assessments were conducted within the project area in 2010 (see Environmental Appendix). Mist net surveys for federally-listed bats may be warranted during the PED phase based on the potential for tree clearing in some areas. Freshwater mussel surveys

are recommended in order to determine the presence/absence of rayed bean and clubshell mussels, which are both federally endangered species that may occur within the area of impact. The USFWS may require formal consultation if federally-listed bat or mussel species are found during future species specific surveys. As per USFWS and ODNR recommendations in the F&WCAR, coordination with both the USFWS and the ODNR DOW will continue to avoid impacts to federal- and state-listed species to the extent practicable.

## 9.5 Farmland Protection Policy Act

Coordination with the NRCS under the Farmland Protection Policy Act was conducted to discern the potential for impacts to prime farmland that would be expected to occur as a result of project implementation. Coordination with the Columbus, Ohio office to meet the requirements of the Farmland Protection Act was completed on November 4, 2013, which included the completion of a Farmland Conversion Impact Rating Form AD-1006 (see Environmental Appendix for completed form). Project implementation would result in non-federal acquisition of farmland in Hancock County. Proposed measures that would impact farmland in Hancock County include the Alternative 2 Western Diversion and the Blanchard to Lye Cut-off (referred to in Form AD-1006 as Sites C and D, respectively—sites A and B include detention dams, which have been screened out during the screening of alternative plans portion of the present Feasibility study).

The Alternative 2 Western Diversion and Blanchard to Lye Cut-off may impact approximately 280 and 108 acres of prime farmland within the project area, respectively. Based on the availability of prime farmland in the vicinity of the proposed project, farmland impacts are not expected to be significant. Per Form AD-1006 and the site assessment criterion contained in 7 CFR §658.5(b), none of these alternatives exceed the limits of farmland conversion within the project area. Refer to the Environmental Appendix for more information.

## 9.6 Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA)

Based on site reconnaissance to date, this project is not expected to impact CERCLA or RCRA designated sites or sites that are part of the National Priorities List (NPL). Recognized environmental conditions (RECs) were detected in the vicinity of the proposed Alternative 2 Alignment, which include an abandoned tank farm (containing approximately 10 to 15 discarded drums) and an excavated tank with piping. These REC sites can be avoided during the siting of the diversion measure in order to avoid a potential release of contaminated materials, if they do persist in these locations. This can be accomplished by shifting the alignment of the diversion channel away from the impacted area during the optimization phase of the project. Assessment of the project site has not identified any areas of concern with the potential to encounter hazardous, toxic, or radiological waste within the vicinity of the proposed Blanchard to Lye Cutoff Levee.

## 9.7 Toxic Substances Control Act

No items regulated under the Toxic Substances Control Act (TSCA), have been verified through site reconnaissance, field testing, and/or laboratory analyses. If any items regulated under these laws are discovered, the project will comply with applicable requirements. Project coordination was initiated with agencies and interests including the USEPA via the scoping process and no comments were received in this regard.

## 9.8 Federal Insecticide, Fungicide, and Rodenticide Act

No items regulated under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), as amended by the Federal Environmental Pesticide Control Act (FEPCA), have been verified through site reconnaissance, field testing, and/or laboratory analyses. If any items regulated under these laws are discovered, the project will comply with applicable requirements.

## 9.9 National Historic Preservation Act

In compliance with Section 106 of the National Historic Preservation Act (NHPA) and Engineer Regulation (ER) 1105-2-50, consultation has been initiated with the Ohio SHPO and potentially interested parties. Information outlining the nature of the project and the proposed alternatives was provided by Ohio SHPO, Federally recognized Indian Nations associated with the region, and other potentially interested consulting parties. Through on-going consultation with the Ohio SHPO regarding historic properties (i.e., listed or eligible for listing on the National Register of Historic Places [NRHP]), it has been determined the proposed project has the potential to effect historic properties. Cultural resources investigations have been undertaken for a portion of the APE, although not all areas have been fully investigated due to a lack of site access. Therefore, further consultation with the Ohio SHPO and other interested parties would need to be undertaken in the future to further define the scope of these additional studies and outline the path forward to full compliance with this Act.

The completion of the remaining Section 106 requirements for this study will accordingly be formalized in a PA, a draft of which is provided in the Environmental Appendix. On February 28, 2015, USACE formally notified the Ohio SHPO of their intent to negotiate a Programmatic Agreement (PA) to fully define remaining requirements to identify and evaluate historic properties within the area of potential effects (APE) for the Tentatively Selected Plan (TSP). At this time, USACE also submitted four completed cultural resources investigation reports to the Ohio SHPO for their review and comment. On March 3, 2015, USACE and Ohio SHPO met to discuss the current status of the study, modifications to the TSP, the scope of remaining cultural resources investigations, and consultation with other potentially interested parties. On this same date, USACE invited other potentially interested parties to consult on this undertaking and participate in the negotiation and development of the PA. To date, the Wyandotte Nation and Mr. Darl Deeds (Eagle Township Trustee) have requested to be consulting parties on this project. The current schedule for executing the PA is in the Summer of 2015.

## 9.10 Clean Air Act

The construction, operation and maintenance of the proposed project is expected to conform to National Ambient Air Quality Standards and the Ohio State Implementation Plan. Copies of this Draft Study/ and EIS have been sent to the Regional Administrator of the U.S. Environmental Protection Agency (USEPA) requesting comments on this conformance. As indicated in Section 8.10 of this draft EIS, no significant adverse impacts to air quality would be expected due to project implementation.

## 9.11 Wild and Scenic Rivers Act

There are no wild and scenic river designations within the area of potential effect of the Blanchard River Watershed. Therefore, impacts to designated rivers are not anticipated. While the Blanchard River is not designated as either wild or scenic in Findlay, the 26-mile stretch flowing between Findlay and Ottawa is listed on the NRI. The NRI is a register of river segments in the United States that potentially qualify as national wild, scenic or recreational river areas. This NRI is a presidential directive that requires federal agencies to avoid or mitigate adverse effects on identified NRI-listed waterway segments to the extent practicable as part of its normal planning and environmental review processes. Agencies are required to consult with the National Park Service prior to taking actions which could effectively foreclose wild, scenic or recreational status for rivers on the inventory (NPS, 2015b).

A copy of the 2012 scoping document was sent to the NPS Regional Rivers Coordinator to formally begin the consultation process with the NPS concerning the current project. While no response was received from the NPS, the USACE followed CEQ recommendations in the synthesis of this integrated report (NPS, 2015c), which included (see Section 8.16 of this report):

- Determining whether the proposed action could affect an NRI river;
- Determining whether the proposed action could have an adverse effect on the natural, cultural, and recreational values of the NRI segment;
- Determining whether the proposed action could foreclose options to classify any portion of the NRI segment as wild, scenic, or recreation river areas; and
- Incorporating mitigation/avoidance measures into the proposed action to the maximum extent feasible within the agency's authority.

USACE met with the NPS Regional Rivers Coordinator in 2012 to discuss the project. As recommended at that meeting, USACE will resume coordination with NPS after release of the Draft Report/EIS to determine if the actions made to date satisfy the requirements of the Wild and Scenic Rivers Act and what modification to the project will be necessary to minimize the impacts to the NRI designation.

## 9.12 Migratory Bird Treaty Act of 1918 and Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds

Coordination with the USFWS to satisfy the intent of the Migratory Bird Treaty Act and Executive Order 13186 concerning Migratory Birds was initiated in conjunction with the NEPA scoping document released in December 2012. The USFWS Ohio Field Office provided a Fish and Wildlife Coordination Act Report in July 2014 (see Environmental Appendix for full report). The report discusses concern over potential impacts associated with loss of nesting habitat within forested and wetland habitats within the project area. The USFWS recommended that impacts to forests and wetlands be minimized in order to limit impacts to nesting birds. They further recommend that any impacts to migratory bird nesting habitat be completed outside of the breeding season, which occurs between April 1 and September 30. The USACE will make every effort to avoid impacts to forests and wetlands and avoid impacts during the breeding season to the extent practicable.

## 9.13 Executive Order 11988 – Flood Plain Management

The US Army Corps of Engineers in cooperation with the non-Federal sponsor (Hancock County) and stakeholders conducted a study to determine the feasibility in reducing flood risk along the Blanchard River in the city of Findlay. Under the guidelines of EO11988, Federal agencies must comply with the Executive Order to formulate projects, that, to the extent possible, avoid or minimize adverse effects associated with the use of the flood plain and to avoid inducing in development in the flood plain unless there is no practicable alternative. As a flood risk management project, modification of the flood plain cannot be avoided while achieving project objectives. A number of non-structural measures were evaluated during the feasibility phase of this investigation that would have reduced damages; however, these measures did not meet the planning criteria or were not economically justified.

As part of part of EO 11988, Federal agencies must recognize the significant value of floodplains and to consider public benefits with restoring and preserving floodplains. In compliance with the executive order, a statement of findings must be documented and a series of questions addressed.

The questions and appropriate replies are as follows:

1) Determine if the proposed action is in the base flood plain.

   The topography surrounding the Blanchard River is relatively flat and once the Blanchard River overflows its banks, damages as a result of flooding occur. Two components of the recommended plan are within the base flood plain. The first is a levee which has been designed to stop the cross flow of the Blanchard River into Lye Creek. This component will significantly delay the peak flow through Findlay by up to five hours when compared to existing peak time. The second component is the inlet structure which will divert

Eagle Creek into the 9.4 mile long diversion channel as well as the outlet into the Blanchard River downstream of Findlay.

2) If the action is in the base flood plain, identify and evaluate practicable alternatives to the action or location of the action in the base flood plain.

   The feasibility study evaluated a suite of measures and alternatives (see Section 6 of the Feasibility Report).

   During the planning phase a series of detention basins; channel widening and deepening; snagging and clearing; construction of levees and floodwalls and the creation of a high velocity channel measures were evaluated qualitatively and quantitatively and were subsequently screened from further consideration as either having limited effectiveness, were cost prohibitive or were technically infeasible. The levee along the Blanchard River provides the most cost effective and environmentally acceptable alternative measure for inclusion as part of the recommended plan. Additionally, the proposed alignment for the diversion channel provides an area conducive for environmental mitigation.

   The city of Findlay and Hancock County have been pro-active in implementing non-structural measures. The measures include a flood warning system, Reverse 911 program, and a comprehensive acquisition program where structures have been purchased using a variety of programs and then structure has been demolished which removes the structure from future risks. Several structures in the area have also been elevated.

3) If the action must be in the flood plain, advise the general public in the affected area and obtain their views and comments.

   Public Coordination has been documented in Section 10. A public meeting was held in December 2012, and additional meetings have been held on a smaller basis with the non-Federal sponsor; community leaders and property owners. A public meeting will be held in Findlay on April 22, 2015 with public availability sessions to be held on April 23, 2015. The draft report and final report will also be available for review and comment.

4) Identify beneficial and adverse impacts due to the action and any expected losses in natural and beneficial flood plain values. Where actions proposed to be located outside the base flood plain will affect the base floodplain, impacts resulting from these actions should also be identified.

   Potential impacts associated with the Recommended Plan are summarized in Chapter 8 of this report. The Recommended Plan is expected to have no significant adverse impact to the natural and beneficial flood plain values. Areas where the floodplain will be reduced as a result of the Recommended Plan are highly urbanized. The Recommended Plan

includes the construction of a diversion channel which is outside the floodplain. Mitigation will include beneficial impacts to the existing floodplain including wetland and stream bank restoration along the Blanchard River, Lye Creek and Aurand Run. The Blanchard/Lye Diversion cutoff levee will be constructed in the floodplain, and will have both adverse and beneficial impacts. USACE and the non-Federal sponsor also recognize the cultural and forestry resource values of the floodplain. It is the intent of the city and county to return natural and beneficial floodplain values to the system as funding and real estate is available. Alternative plans to the proposed action included further evacuation of the floodplain, but was determined to not be cost effective.

5) If the action is likely to induce development in the flood plain, determine if a practicable non-flood plain alternative for the development exists.

The Recommended Plan is not likely to induce significant development in the base floodplain. The portion of the watershed which will receive the benefit of the project is determined to be primarily developed under existing conditions resulting in almost no land available for induced growth due to the Recommended Plan. For new development and significant redevelopment, the city and county have stringent floodplain management regulations. Any new construction must demonstrate that they have zero impact on their neighbors or landowners downstream at any flood event. Hancock County is also actively evacuating the floodplain with local, state, and Federal HMGP grants. The lands purchased with the funds have deed restrictions limiting future development and restores floodplain values. The city of Findlay and Hancock County also have zoning and land use regulations to further manage growth and prevent further encroachment on the floodplain.

6) As part of the planning process under Principles and Guidelines, determine viable methods to minimize any adverse impact of the action including any likely induced development for which there is no practicable alternative and methods to restore and preserve the natural and beneficial flood plain values. This should include reevaluation of the “no-action” alternative.

There is no anticipated additional induced development in the floodplain from the proposed action as the majority of the benefits from the Recommended Plan will occur in existing urban areas. The proposed action should improve flood plain values with the addition of the diversion channel and cutoff levee. Additional measures to minimize adverse impacts include the city and county’s floodplain management ordinance as well as their efforts to continue to remove structures from the floodplain. The “no action” alternative will not result in additional development in the floodplain as the floodplain is primarily developed and is currently regulated.

7) If the final determination is made that no practicable alternative exists to locating the action in the flood plain, advise the general public in the affected area of the findings.

The Draft Feasibility Report and EIS was released for 45-days of public review on April 10, 2015. The Final Feasibility Report and EIS will be released for public review, along with State and Agency Review in early 2016. Further documentation will be provided in the Final Feasibility Study/EIS.

8) Recommend the plan most responsive to the planning objectives established by the study and consistent with the requirements of the Executive Order.

   The objective of the project is to reduce the probability and consequences of flood risk and associated damages in the study area. The project is responsive to the EO 11988 objective of "avoidance, to the extent possible, of long- and short-term adverse impacts associated with the occupancy and modification of the base flood plain, and the avoidance of direct and indirect support of development in the base flood plain wherever there is a practicable alternative" because the proposed features focus on reducing the threat of flooding to the existing urban area, altering a very small footprint within the flood plain. These features would reduce the hazard and risk associated with floods, thereby minimizing both the probability and the consequences of flooding within the urban area, and would preserve the natural and beneficial values of the base flood plain.

## 9.14 Executive Order 11990 – Protection of Wetlands

Wetlands will be impacted through implementation of this project (see Section 8.6 of the EIS). A thorough analysis was conducted in order to avoid and minimize wetland impacts associated with each project measure. Compensatory wetland mitigation will be required which would be completed within the Blanchard River watershed to help ensure a no net loss of wetlands, but has not yet been finalized due to a lack of sufficient site access to fully document existing wetland conditions (see Mitigation Appendix for further details).

## 9.15 Executive Order 12898 – Environmental Justice

Based on the available minority, poverty and income data from the American Community Structure Survey of 2010, the proposed project is not expected to incur any disproportionate impact to minorities or low income populations within Hancock County (see Section 8.20 of the EIS). The proposed project is in full compliance with Executive Order 12898.

## 9.16 Executive Order 13045 – Protection of Children from Environmental Health and Safety Risks

Data gathered from the American Community Structure Survey of 2010 concerning age structure in Hancock County indicates that the areas of induced flooding also do not disproportionately impact locations with higher percentages of populations under the age of 18 (see Section 8.20 of the EIS). Therefore, the proposed action is not expected to have environmental or safety risks that may disproportionately affect children.

## 9.17 Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management

This Executive Order directs federal agencies to conduct their environmental, transportation, and energy-related activities in an environmentally, economically, and fiscally sound and sustainable manner. The USACE strives to protect, sustain, and improve the natural and man-made environment of the nation, and is committed to compliance with applicable environmental and energy statutes, regulations, and Executive Orders. Sustainability as an overarching concept encompassing energy, climate change and the environment to ensure that federal activities do not negatively impact resources for future generations. The recommended plan will provide for sustainable solutions that address both short- and long-term environmental, social and economic considerations.

## 9.18 Executive Order 13514 – Federal Leadership in Environmental, Energy, and Economic Performance

The goal of Executive Order 13514 is "to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of GHG emissions a priority for federal agencies." Consistent with this goal, USACE will seek the following targets in association with the design and construction this project:

- Pursue opportunities with vendors and contractors to reduce GHG emissions (i.e., transportation options and supply chain activities);
- Use low GHG-emitting vehicles (e.g., clean diesel technologies);
- Implement source reduction to minimize waste and pollutant generation; and
- Decrease use of chemicals directly associated with GHG emissions.

## 9.19 Executive Order 13653 – Preparing the United States for the Impacts of Climate Change

Executive Order 13653 outlines federal agency responsibilities in the areas of supporting climate resilient investment; managing lands and waters for climate preparedness and resilience; providing information, data and tools for climate change preparedness and resilience; and planning. In response, USACE has developed a policy to mainstream climate change adaptation in all activities to help enhance the resilience of both the built and natural water resource infrastructure and reduce its potential vulnerabilities to the effects of climate change and variability. A qualitative analysis of climate change considerations has been completed for the recommended plan to help ensure resiliency in the face of possible increased storm frequency and intensity, as well as other effects associated with climate change. This analysis has concluded that observed runoff data for the study area shows a statistically significant positive trend (i.e., increased runoff) over the next 50 years (see Hydraulics and Hydrology Appendix).

## 9.20 Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments

Executive Order 13175 outlines Federal agency responsibilities in the areas of regular and meaningful collaboration and consultation with tribal officials in order to develop federal policies that have tribal implications, to galvanize government-to-government relationships between the United States and Indian tribes and to decrease the imposition of unfunded mandates on Indian tribes.

The USACE has identified several Indian Nations that have ancestral homelands within the Blanchard River watershed (see Table 10.8 in Section 10.4 for further details). Currently, these Nations have no lands within the study area; however, their cultural affiliation with the watershed transcends their present geographic boundaries. As directed by the aforementioned Federal mandates as well as consultation requirements of the NHPA and NEPA, USACE has initiated consultation with these nations. Initially, each Nation was requested to express their interest or concerns regarding the study during the study's scoping process in December 2012. Potentially interested Nations were subsequently invited to become involved as a consulting party on December 3, 2012. On December 11, 2012, the Wyandotte Nation requested involvement as a consulting party on this study. USACE provided updated information on the study to these nations on June 4, 2014, and again requested their participation. At this time, no additional Nations expressed an interest in consultation on this study.

An on-site meeting has been requested with the Wyandotte Nation in Spring 2015 (as well as any other interested Nations) to begin their active involvement in the formulation of a PA which will identify their concerns and recommendations as well as define future actions to identify and evaluate potentially affected historic properties and assess the possible effects of the project on these properties.

## 9.21 Executive Order 13112 – Invasive Species

Executive Order 13112 outlines Federal agency responsibilities in the prevention of invasive species spread/introduction and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

While rights of entry have limited the available information concerning whether or not invasive species persist within the project area, desktop studies indicate that invasive species are not expected to be encountered, as most land cover consist of croplands. The presumed absence of invasive species in the project area is also supported by a lack of comment concerning invasive species from the resource agencies. If any invasive species are encountered during the course of project implementation, appropriate measures, including BMPs will be utilized in order to limit the spread of invasive species. See the Mitigation Appendix for further information.

## 9.22 Obstruction Evaluation/Airport Airspace Analysis

The Federal Aviation Administration (FAA) administers Title 14 of the Code of Federal Regulations (14 CFR Part 77) to promote air safety and the efficient use of navigable airspace (FAA, 2014). The FAA requires that any agency that is planning construction or alterations that may affect navigable airspace to file a Notice of Proposed Construction or Alteration. None of the construction and/or alteration activities outlined in the 14 CFR 77.9 are proposed for the present flood risk management project. Therefore, coordination with the FAA with respect to conducting an obstruction evaluation/airport airspace analysis is not warranted at this time.

# 10.0 Public and Agency Involvement

## 10.1 Meetings with the Project Sponsors

Meetings with the project sponsor have taken place in person and via conference call on a regular basis since the major flooding event that occurred in the Blanchard Watershed in August 2007. Participants at these meetings have included USACE staff and personnel from Hancock County and the city of Findlay. The Maumee Watershed Conservancy District is the most likely non-federal sponsor for the implementation phase of the project, and has been involved in project planning, however they cannot act as project sponsor until the Feasibility Study is complete.

## 10.2 Meetings with the Resources Agencies

Meetings with the ODNR, OEPA, the Ohio Emergency Management Agency (OEMA), Ohio SHPO and USFWS concerning the Blanchard project were initiated in June 2009. The first agency meeting was between USACE and the USFWS and included a site visit where potential measures at that time were discussed. Table 10.2 outlines subsequent meetings that were held in various locations between August 2009 and September 2014. Most meetings were to seek applicable input from these agencies early and often throughout the Planning Process to help ensure that any resource concerns were identified as early as possible, and also to outline or clarify any possible future regulatory compliance requirements. Information provided from the agencies during these meetings will be made part of the project's Administrative Record.

Comments received from the USFWS and ODNR-DOW were centered around the project mitigation approach, avoidance/minimization of environmental impacts to listed species and their respective habitats as well as avoidance/minimization of impacts to fish spawning activities. Comments received from the USEPA focused on project impacts (e.g., those to air quality and potential hazardous waste), an account of the expected cumulative impacts of the project (based on other known or proposed projects in the area), the use of BMPs, impacts to listed species and their respective habitats, project coordination with other applicable agencies and mitigation approach. Comments received from the NPS expressed general disapproval for the potential for levees to be constructed within the NRI-designated stretch of the Blanchard River. Ohio Environmental Protection Agency comments centered on water quality impacts to wetlands and

streams and the associated mitigation approach. The Federal Emergency Management Agency specifically asked that the USACE provide a Conditional Letter of Map Revision (CLOMR) and a Letter of Map Revision (LOMR) so that FEMA can update the pertinent flood maps accordingly. ODNR Division of Soil and Water Resources and the OEMA echoed the comments received by FEMA. A full account of the comments received from the resource agencies during the scoping phase of the present study, and responses, are available in the Environmental Appendix.

Table 10.2. Meetings with Resource Agencies concerning the Blanchard project

| Meeting Date(s) | Agencies in Attendance | Location | Meeting Purpose |
|---|---|---|---|
| 5-6 AUG 2009 | OEPA, ODNR, SHPO, USFWS | Columbus, OH | Technical meeting on project purpose, scope, schedule, & seek input. |
| 15-16 DEC 2009 | OEPA, ODNR, SHPO, USFWS | Columbus, OH | Technical meeting on preliminary project measures, updates and seek input. |
| 3-5 MAY 2010 | OEPA, ODNR, SHPO, USFWS | Cleveland & Columbus, OH | Technical meeting on project purpose, updates and seek input. |
| 14-16 FEB 2012 | OEPA, ODNR, SHPO, USFWS | Columbus, OH | Technical meeting on project purpose, updates and seek input. |
| 16-17 OCT 2012 | OEPA, ODNR, SHPO, USFWS | Columbus, OH | Technical meeting on project purpose, updates and seek input. |
| 18 OCT 2012 | FEMA | Chicago, IL | Introduce project to agency representative and solicit early input. |
| 26 OCT 2012 | NPS | Omaha, NE | Introduce project to agency representative and solicit early input. |
| 10-11 SEP 2013 | OEPA, ODNR, SHPO, OEMA, USFWS | Columbus, OH | Technical meeting, Regulatory Requirements, solicit input. Pursue Section 106 compliance via Programmatic Agreement and apply for Section 401 certification during PED phase. |
| 16-17, & 22 JUL 2014 | OEPA, ODNR, SHPO,USFWS, OEMA | Columbus, OH | Updates to regulatory agencies on likely recommended plan prior to public coordination. Continue solicitation of feedback on plans and future regulatory requirements. |
| 11 FEB 2015 | USEPA | Chicago, IL | Final updates to agency on likely recommended plan prior to public coordination. Continue solicitation of feedback on plans and future regulatory requirements. |
| 3 & 4 MAR 2015 | OEPA, ODNR, SHPO,USFWS,OEMA | Columbus, OH | Final updates to regulatory agencies on likely recommended plan prior to public coordination. Continue solicitation of feedback on plans and future regulatory requirements. |

## 10.3 Meetings with the Public

Meetings with the general public have been held in Findlay and Ottawa as part of the NEPA process beginning in November 2011. Land owner meetings have also been held to discuss the potential impacts of measure implementation to landowners as part of the proposed project.

Comments received from the public included the potential for induced flooding, compensation for impacts to homes and agricultural areas, public health and safety, project impacts (including those involving environmental, economics and transportation) as well as project recommendations and costs. Public comments received during the scoping phase of this study, as well as responses to those comments, are available in the Environmental Appendix.

Table 10.3. Meetings/Events with the General Public concerning the Blanchard Project

| Public Information Meeting | Meeting Date(s) | Time | Location | Attendees |
|---|---|---|---|---|
| NEPA Scoping of GI Study | 14 NOV 2011 | 4:00 – 5:00 | Putnam County Educational Services Center, Ottawa*, Ohio | 75 |
| NEPA Scoping of GI Study | 14 NOV 2011 | 7:00 – 8:00 | Winebrenner Auditorium, University of Findlay | 300 |
| Landowner Information Meeting | 09 MAY, 2012 | 7:00 – 9:00 p.m. | Hancock County Agricultural Center, Findlay, Ohio | 79 |
| Landowner Information Meeting | 10 MAY 2012 | 9:00 – 11:00 a.m. | Hancock County Agricultural Center, Findlay, Ohio | 26 |
| NEPA Scoping – Final Array of Alternatives | 10 DEC 2012 | 7:00 – 9:00 p.m. | Ottawa-Glendorf High School, Ottawa, Ohio | 97 |
| NEPA Scoping Final Array of Alternatives | 11 DEC 2012 | 9:00 – 11:00 a.m. | Putnam County Educational Service Center, Ottawa*, Ohio | 60 |
| NEPA –Scoping Final Array | 11 DEC 2012 | 7:00 – 9:00 p.m. | Findlay High School, Findlay, Ohio | 300 |
| NEPA –Scoping Final Array | 12 DEC 2012 | 9:00 – 11:00 a.m. | Hancock County Agricultural Center, Findlay, Ohio | 104 |
| Press Event | 9 APR 2014 | 9:00 a.m. | USACE announcement of new study schedule following receipt of federal funding | < 10 |
| Press Event | 28 JUL 2014 | | Update on Study Progress and Schedule toward Fall 2014 | Varies |
| Press Event | 6 AUG 2014 | Afternoon | Update on Study Progress, Schedule, and Joint Press Event with local officials | Varies |
| Landowner Information Meeting & Press Event | 13-14 NOV 2014 | Afternoon of 13 NOV & 9:00 a.m. on 14 NOV, resp. | Several Farmsteads west, south, and east of Findlay on 13 Nov and Press Event for release of TSP on 14 NOV | Varies |

* Meetings were also held in Ottawa, as the project at that time still included measures within village of Ottawa limits that were later screened out.

## 10.4 Tribal Consultation

The United States has a unique legal and political relationship with Indian nations that is established through and confirmed by the U.S. Constitution, and applicable treaties, statutes, executive orders, and judicial decisions. Under Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000) and Presidential Memorandum, *Tribal Consultation* (November 6, 2009), federal agencies are directed to engage in regular and meaningful consultation and collaboration with Indian nations in the development of federal policies that have implications to Indian lands and resources, and are responsible for strengthening the government-to-government relationship between the United States and Indian nations.

The USACE has identified several Indian nations that have ancestral homelands within the Blanchard River watershed (Table 10.8). Currently, these nations have no lands within the study area, however, their cultural affiliation with the watershed transcends their present geographic boundaries.

| Table 10.4. Federally Recognized Tribes with Interest in the Study Area | |
|---|---|
| Miami | • Miami Tribe of Oklahoma |
| Ottawa | • Little River Band of Ottawa Indians, Michigan<br>• Little Traverse Bay Bands of Odawa Indians, Michigan<br>• Ottawa Tribe of Oklahoma |
| Shawnee | • Absentee-Shawnee Tribe of Indians of Oklahoma<br>• Eastern Shawnee Tribe of Oklahoma<br>• Shawnee Tribe, Oklahoma |
| Wyandotte | • Wyandotte Nation, Oklahoma |

Names reflect those of federally recognized tribes as currently listed by the Bureau of Indian Affairs. These names may vary from the official name attributed by each individual government.

As directed by the aforementioned federal mandates as well as consultation requirements of the NHPA and NEPA, USACE has initiated consultation with these nations. Initially, each nation was requested to express their interest or concerns regarding the study during the scoping process in December 2012. Potentially interested nations were subsequently invited to become involved as a consulting party on December 3, 2012. On December 11, 2012, the Wyandotte Nation requested involvement as a consulting party on this study. USACE provided updated information on the study to these nations on June 4, 2014, and again requested their participation. At this time, no additional nations expressed an interest in participation in this study.

An on-site meeting will be convened with the Wyandotte Nation in Spring 2015 (as well as any other interested nations) to begin their active involvement in the formulation of a PA which will identify their concerns and recommendations as well as define future actions to identify and evaluate potentially affected historic properties and assess the possible effects of the project on these properties.

## 10.5 Project Website

The project's primary website is available at: http://www.lrb.usace.army.mil/Missions/CivilWorks/DistrictProjects/BlanchardRiverWatershed.aspx. The purpose of the website is to serve as a source of information to the public. This website was made available at public meetings, pamphlets, and distributed with information as part of the NEPA process. The website also provides the interested public with opportunities to ask questions, submit comments through e-mail, or be added to an email mailing list.

A Facebook site (www.facebook.com/blanchard.watershed) was also used to communicate study information to the public. The social media site was also used to keep the public engaged by using it as a means to comment and receive information on the watershed.

# 11.0 Recommendation

As District Engineer, I have considered the environmental, social, and economic effects, the engineering feasibility, and comments received from the other resource agencies, the non-

Federal sponsors, and the public, and have determined that the recommended plan presented in this report is in the overall public interest and is technically sound, environmentally acceptable, and economically feasible with a BCR of 1.22. I recommend that the recommended plan and associated features described in this report be authorized for implementation as a Federal project.

The recommended plan is the National Economic Development Plan, which is Plan F2, as generally described in this report. The plan includes flood risk management features including but not limited to: diversion channel of Eagle Creek to flow around the city of Findlay and a containment levee along the Blanchard River that will limit the amount of overland flow of Blanchard Creek floodwaters to Lye Creek. . All new railroad bridges, modifications to existing railroad bridges, track modification and associated features will be cost-shared as part of the project construction costs. The preliminary estimated implementation cost is $71,393,000, with the Federal and non-Federal shares of the total estimated at $43,278,000 and $28,661,400, respectively.

These recommendations are made with the provision that, prior to implementation, the non-Federal sponsors will agree to comply with the following requirements:

Federal implementation of the recommended plan would be subject to the non-Federal sponsors agreeing to comply with applicable Federal laws and policies, including but not limited to:

a. Provide a minimum of 35 percent, but not to exceed 50 percent of total flood risk management costs as further specified below:

(1) Provide the required non-Federal share of design costs allocated by the Government to flood risk management in accordance with the terms of a design agreement entered into prior to commencement of design work for the flood risk management features;

(2) Provide, during construction, a contribution of funds equal to 5 percent of total flood risk management costs;

(3) Provide all lands, easements, and rights-of-way, including those required for relocations, the borrowing of material, and the disposal of dredged or excavated material; perform or ensure the performance of all relocations; and construct all improvements required on lands, easements, and rights-of way to enable the disposal of dredged or excavated material all as determined by the Government to be required or to be necessary for the construction, operation, and maintenance of the flood risk management features;

(4) Provide, during construction, any additional funds necessary to make its total contribution for flood risk management equal to at least 35 percent of total flood risk management costs;

b. Shall not use funds from other Federal programs, including any non-Federal contribution required as a matching share therefore, to meet any of the non-Federal obligations for the project

unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is authorized;

c. Not less than once each year, inform affected interests of the extent of protection afforded by the flood risk management features;

d. Agree to participate in and comply with applicable Federal floodplain management and flood insurance programs;

e. Comply with Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), which requires a non-Federal interest to prepare a floodplain management plan within one year after the date of signing a Project Partnership Agreement, and to implement such plan not later than one year after completion of construction of the flood risk management features;

f. Publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the flood risk management features;

g. Prevent obstructions or encroachments on the project (including prescribing and enforcing regulations to prevent such obstructions or encroachments) such as any new developments on project lands, easements, and rights-of-way or the addition of facilities which might reduce the level of protection of the flood risk management features afford, hinder operation and maintenance of the project or interfere with the project's proper function;

h. Comply with all applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way required for construction, operation, and maintenance of the project, including those necessary for relocations, the borrowing of materials or the disposal of dredged or excavated material; and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;

i. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project, or functional portions of the project, including any mitigation features, at no cost to the Federal Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and state laws and regulations and any specific directions prescribed by the Federal Government;

j. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project for the purpose of completing, inspecting, operating, maintaining, repairing, rehabilitating or replacing

the project;

k. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, rehabilitation, and replacement of the project and any betterments, except for damages due to the fault or negligence of the United States or its contractors;

l. Keep and maintain books, records, documents or other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents or other evidence are required, to the extent and in such detail as will properly reflect total project costs, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

m. Comply with all applicable Federal and state laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army"; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701 – 3708 (revising, codifying and enacting without substantial change the provisions of the Davis Bacon Act (formerly 40 U.S.C. 276a et seq.), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 et seq.), and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c et seq.);

n. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on or under lands, easements or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non- Federal sponsors with prior specific written direction, in which case the non-Federal sponsors shall perform such investigations in accordance with such written direction;

o. Assume, as between the Federal Government and the non-Federal sponsors, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on or under lands, easements or rights-of-way that the Federal Government determines to be required for construction, operation, and maintenance of the project;

p. Agree, as between the Federal Government and the non-Federal sponsors, that the non-Federal sponsors shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, repair, rehabilitate, and replace the project in a manner that will not cause liability to arise under CERCLA; and

q. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5b), and Section 103(j) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2213(j)), which provides that the Secretary of the Army shall not commence the construction of any water resources project or separable element thereof, until each non-Federal interest has entered into a written agreement to furnish its required cooperation for the project or separable element.

This plan is being recommended with such modifications thereof as in the discretion of the Commander, HQUSACE, may be advisable. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to Congress, the non-Federal sponsors, the (sponsor), interested Federal agencies, and other parties will be advised of any modifications and will be afforded the opportunity to comment further.

## 12.0 List of Preparers

Table 12.0 List of Integrated Report Preparers

| Name | Discipline | Organization |
|---|---|---|
| Michael Pniewski | Project Management | Buffalo District - USACE |
| Jan Marie Hemberger | Archeologist | Louisville District - USACE |
| Paul Polanski | Cost Engineering | Buffalo District - USACE |
| Anthony Korves | Cost Engineering | Buffalo District - USACE |
| Frank Lewandowski | Design Engineering | Buffalo District - USACE |
| Stephen Stalikas | Economics | Buffalo District - USACE |
| Richard Ruby | Ecosystem Restoration | Buffalo District - USACE |
| William Butler III | Environmental Analysis | Buffalo District - USACE |
| Chris Akios | Environmental Analysis | Buffalo District - USACE |
| Michael Voorhees | Environmental Analysis | Buffalo District - USACE |
| Reed Vetovitz | Geotechnical Engineering | Buffalo District - USACE |
| Paul Cocca | Hydraulics & Hydrology | Buffalo District - USACE |
| Keith Koralewski | Hydraulics & Hydrology | Buffalo District - USACE |

| | | |
|---|---|---|
| Raziul Mollah | Hydraulics & Hydrology | Pittsburgh District - USACE |
| Laura Ortiz | Planning | Buffalo District - USACE |
| Lynn Greer | Public Outreach | Buffalo District - USACE |
| Andrew Kornacki | Public Outreach | Buffalo District - USACE |
| Jennifer Janik | Real Estate | Buffalo District - USACE |
| Paula Kohl | Real Estate | Buffalo District - USACE |
| Michael Cannon | Project Management & Planning | URS |
| Jason Weiss | Economics & Planning | URS |
| Doug Cauble | Geotechnical Engineering | URS |
| Jay Mosley | Hydraulics & Hydrology | URS |
| Anna Foley | Planning | URS |
| John Dromsky-Reed | Planning, Design & Cost Engineering | URS |

## 13.0 List of Coordinating/Consulting Nations, Organizations and Agencies

In addition to the coordinating/consulting parties listed in Table 13.0, a notice of availability of the Draft Feasibility Report/EIS will be provided to the Great Lakes Information Network, local news media, including the Toledo Blade, Findlay Courier, Lima News, Putnam County Sentinel, and local television and radio outlets in Northwestern Ohio. The notice of availability will be posted on the USACE Buffalo District website as well as on the Buffalo District and Blanchard study Facebook site. A notice will also be provided via email to the approximately 250 parties who have previously indicated their continued interest in the study.

Table 13.0. List of Indian Nations, Agencies, Organizations, Businesses and Individuals

| | |
|---|---|
| **Indian Nations** | |
| Absentee-Shawnee Tribe of Indians | Miami Tribe of Oklahoma |
| Eastern Shawnee Tribe of Oklahoma | Ottawa Tribe of Oklahoma |
| Little River Band of Ottawa Indians | Shawnee Tribe |
| Little Traverse Bay Bands of Odawa Indians | Wyandotte Nation |
| **Federal Agencies** | |
| Federal Emergency Management Agency | US Department of Health & Human Services - Centers for Disease Control & Prevention |
| National Park Service – Midwest Region | US Department of Housing and Urban Development |
| US Department of Agriculture –Forest Service Region | US Department of Transportation - Federal Highway |

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| 9 | Administration |
| US Department of Agriculture – Natural Resource Conservation Service | US Department of Transportation – Federal Railroad Administration |
| US Department of Agriculture – Ohio State Farm Service Agency Office | US Environmental Protection Agency – Region 5 |
| US Department of Commerce - National Oceanic & Atmospheric Administration | US Fish and Wildlife Service – Ohio Field Office |
| US Department of Energy | |
| **State Agencies** | |
| Ohio Environmental Protection Agency | Ohio Department of Transportation |
| Ohio Department of Health | ODNR – Division of Geological Survey |
| ODNR – Division of Wildlife | Ohio Historical Preservation Office |
| ODNR – Division of Engineering | Ohio Emergency Management Agency |
| **Local Agencies** | |
| City of Findlay | Liberty Township Trustees |
| Eagle Township Trustees | Hancock County Commissioners |
| Jackson Township Trustees | Hancock County Soil & Water Conservation District |
| Western Lake Erie Historical Society | Marion Township Trustees |
| **Organizations** | |
| Boy Scouts of America | Northwest Ohio Railroad Preservation Inc. |
| Hancock Historical Museum Association | Western Lake Erie Historical Society |
| Audubon Society | Trout Unlimited |
| Nature Conservancy | Ducks Unlimited |
| Izaak Walton League | League of Women Voters |
| **Businesses** | |
| Norfolk Southern Railway | |

# 14.0 Glossary and Acronyms

## 14.1 Glossary

Alluvium: Material deposited by rivers or streams.

American Society for Testing and Materials (ASTM): An international standards organization that develops and publishes voluntary consensus technical standards for a wide range of materials, products, systems, and services.

Aquifer: Geologic formation containing or conducting groundwater.

Area of potential effects (APE): The geographic area or areas within which a project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of a project and may be different for different kinds of effects caused by the project.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A 1980 federal law, also known as Superfund, designed to clean up sites contaminated with hazardous substances as well as broadly defined "pollutants or contaminants".

Cultural resources: Any prehistoric or historic district, site, building, structure or object that evidences of human occupation or activity that is important in the history, architecture, or archaeology of a community or region. This includes properties of traditional religious and cultural importance to an Indian Nation or Native Hawaiian organization.

Dolomite: Sedimentary carbonate bedrock composed mainly of the mineral dolomite.

Ecosystem: Living and nonliving components of the environment that interact or function together.

Endangered Species: Any species of organism defined by the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range. Endangered Species are published in the Federal Register.

Environmental Impact Statement (EIS): A report that documents the information required to evaluate the environmental impact of a project. It informs decision makers and the public of the practicable alternatives that would avoid or minimize adverse impacts or enhance the quality of the environment.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): A federal law that established the basic system of pesticide regulation. It was revised in 1972 by the Federal Environmental Pesticide Control Act and several others have expanded USEPA's authority to oversee the sales and use of pesticides.

Geomorphology: The study of the characteristics, origin, and development of landforms.

Glacial Till: Unsorted material deposited at the ice/ground interface of a glacier.

Glaciation: Interval of time within an ice age that is marked by colder temperatures and glacier advances.

Ground moraine: Unsorted material deposited at the ground surface beneath a glacier.

Habitat: The place or conditions where an organism lives or can potentially live. The organism can be an individual, a population, or taxonomic group. In the present context, habitat refers to an area that provides some portion of the requirements for the life history of a given species.

Historic properties: Any prehistoric or historic district, site, building, structure or object, listed in, or eligible for listing in the NRHP maintained by the Secretary of the Interior (including artifacts, records and remains that are related to/located within such properties). It also includes properties of traditional religious and cultural importance to an Indian Nation or Native Hawaiian organization and that are listed in, or eligible for listing in the NRHP.

Hydrogen Sulfide: A gas that dissolves readily in water producing a nuisance "rotten egg" odor.

Lobe (glacial): Projection from a continental glacier's main mass.

Morainal: Associated with the ice/ground interface of a glacier.

National Environmental Policy Act (NEPA): The federal law, going into effect on January 1, 1970, that establishes a national policy for the environment and requires federal agencies (1) to become aware of the environmental ramifications of their proposed action, (2) to fully disclose to the public proposed federal actions and provide a mechanism for public input to federal decision making, and (3) to prepare environmental impact statements for every major action that would significantly affect the quality of the human environment.

National Register of Historic Places (NRHP):

Pleistocene Epoch: Geological epoch which lasted from about 2.6 million to 11,700 years ago, spanning the Earth's recent period of repeated glaciations.

Permeability: The rate of flow of a liquid through a porous material.

Porosity: The measure of void spaces in a material.

Programmatic agreement (PA): A document that records the terms and conditions agreed upon to resolve the potential adverse effects of a federal agency program, a complex project or in this case when effects on historic properties cannot be fully determined prior to approval of the project.

Project: The broad term covering federally constructed and maintained channels and structures. A project is a channel or facility constructed for a variety of authorized purposes, including but not limited to hydroelectric generation, flood risk management, navigation, and ecosystem restoration.

Potentiometric surface: The level to which groundwater in a confined aquifer would rise to if not confined.

Quaternary Period: Most recent 2.6 million years of Earth's history.

Resource Conservation and Recovery Act (RCRA): A federal law enacted in 1976 that governs the disposal of solid waste and hazardous waste.

Species: A group of organisms that can interbreed naturally (a common gene pool that is biologically isolated from closely related species) and is designated by an available and valid scientific name.

Terminal moraine: A ridge of accumulation of glacial debris deposited at the leading edge of a glacial advance.

Threatened Species: and organism identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register. These organisms are likely to become endangered through all or a significant portion of their range within the foreseeable future.

Toxic Substances Control Act (TSCA): A federal law enacted in 1976 that regulates the introduction of new or already existing chemicals. TSCA specifically regulates polychlorinated biphenyl (PCB) products.

Upper Silurian Salina Group: A group of bedrock types consisting mainly of the carbonate mineral dolomite.

## 14.2 Acronyms

The following acronyms have or will be used within documents pertaining to the Blanchard River Flood Risk Management Feasibility Study and EIS:

| | |
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| AAD | Annual Average Damage |
| ACE | Annual Chance Exceedance |
| ACS | American Community Survey |
| ADT | Average Daily Traffic |
| AGNPS | Upper Auglaize Watershed Agriculture Non-Point Source |
| APE | Area of Potential Effects |
| ASTM | American Society for Testing and Materials |
| BMP | Best Management Practice |
| BP | Before Present |
| BRW | Blanchard River Watershed |
| B&GEPA | Bald & Golden Eagle Protection Act |
| CAA | Clean Air Act |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| cfs | Cubic Feet per Second |
| CLOMR | Conditional Letter of Map Revision |
| CN | Curve Number |
| $CO_2$ | Carbon Dioxide |
| CSO | Combined Sewer Overflow |
| CSS | Combined Sewer System |
| CSVR | Content-to-Structure-Value Ratio |
| CY | Cubic Yards |
| dBA | Decibel (A-weighted) |
| DDF | Depth-Damage Function |
| DEM | Digital Elevation Model |
| DoD | Department of Defense |
| EIS | Environmental Impact Statement |
| EO | Executive Order |
| ESA | Environmental Site Assessment |
| ESA | Endangered Species Act |

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| F&WCAR | Fish and Wildlife Coordination Act Report |
| FAA | Federal Aviation Administration |
| FEPCA | Federal Environmental Pesticide Control Act |
| FIFRA | Federal Insecticide, Fungicide, and Rodenticide Act |
| FIS | Flood Insurance Study |
| FFE | First Floor Elevation |
| ft | Foot (feet) |
| FR | Federal Register |
| GI/FS | General Investigation Feasibility Study |
| GIS | Geographic Information System |
| GHG | Greenhouse Gases |
| GPM | Gallons Per Minute |
| HEC-GeoHMS | Hydrologic Engineering Center's Geospatial Hydrologic Modeling Extension |
| HEC-FDA | Hydrologic Engineering Center's Flood Damage Assessment |
| HEC-HMS | [USACE] Hydrologic Engineering Center Hydrologic Modeling System |
| HMGP | Hazard Mitigation Grant Program |
| H&H | Hydrology and Hydraulics |
| IDC | Interest During Construction |
| IDF | Inflow Design Flood |
| O&M | Operation and Maintenance |
| IWR | Institute of Water Resources |
| LERRD | Lands, Easements, Rights-of-way, Relocation, and Dredged Disposal Areas |
| LIS | Laurentide Ice Sheet |
| LOMR | Letter of Map Revision |
| LPP | Locally Preferred Plan |
| LTCP | Long Term Control Plan |
| LUST | Leaking Underground Storage Tank |
| MBTA | Migratory Bird Treaty Act |
| MOU | Memorandum of Understanding |
| MS4s | Multiple Separate Storm Sewer Systems |
| $N_2O$ | Nitrous Dioxide |
| NAAQS | National Ambient Air Quality Standards |
| NASS | National Agricultural Statistics Service |
| NAVD | North American Vertical Datum |
| N/A | Not Applicable |
| NED | National Economic Development (plan) |
| NEPA | National Environmental Policy Act |
| NER | National Ecosystem Restoration (plan) |
| NHPA | National Historic Preservation Act |
| NLCD | National Land Cover Database |
| NJDOT | New Jersey Department of Transportation |
| NPDES | National Pollutant Discharge Elimination System |
| NPL | National Priorities List |
| NRCS | Natural Resource Conservation Service |
| NRHP | National Register of Historic Places |
| NRI | National Resources Inventory |

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| NWI | National Wetlands Inventory |
| NWOFMP | Northwest Ohio Flood Mitigation Partnership |
| $O_3$ | Ozone |
| OAI | Ohio Archaeological Inventory |
| OEPA | Ohio Environmental Protection Agency |
| ODNR | Ohio Department of Natural Resources |
| ODOT | Ohio Department of Transportation |
| OHI | Ohio Historic Inventory |
| OMB | Office of Management and Budget |
| OOWD | Ohio Office of Workforce Development |
| ORAM | Ohio Rapid Assessment Method |
| ORC | Ohio Revised Code |
| OSE | Other Social Effects |
| PA | Programmatic Agreement |
| PAH | Polycyclic Aromatic Hydrocarbon |
| Pb | Lead |
| PCBs | Polychlorinated Biphenyls |
| PED | Preconstruction Engineering and Design |
| PM | Particulate Matter |
| PMF | Probable Maximum Flood |
| P&G | Principles and Guidelines |
| QHEI | Qualitative Habitat Evaluation Index |
| RCBC | Reinforced Concrete Box Culvert |
| RCRA | Resource Conservation and Recovery Act |
| REC | Recognized Environmental Condition |
| RED | Regional Economic Development |
| SAAQS | State Ambient Air Quality Standards |
| SCS | Soil Conservation Service |
| SHPO | State Historic Preservation Office |
| $SO_2$ | Sulfur Dioxide |
| SSURGO | Soil Survey Geographic Database |
| TMDL | Total Maximum Daily Load |
| TSCA | Toxic Substances Control Act |
| USACE | United States Army Corps of Engineers |
| USCB | United States Census Bureau |
| USDA | United States Department of Agriculture |
| USEPA | United States Environmental Protection Agency |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| VCP | Voluntary Cleanup Program |
| WOPC | Without-Project Condition |
| WRDA 99 | Water Resources Development Act of 1999 |

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